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## Policy research on the development of port operation service in response to the growing needs of the cruise industry in South Korea

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**WORLD MARITIME UNIVERSITY**

Malmö, Sweden

**POLICY RESEARCH ON THE DEVELOPMENT  
OF PORT OPERATION SERVICE IN  
RESPONSE TO THE GROWING NEEDS OF  
THE CRUISE INDUSTRY IN SOUTH KOREA**

By

**JAEGEON KIM**  
**The Republic of Korea**

A dissertation submitted to the World Maritime University in partial  
fulfilment of the requirement for the award of the degree of

**MASTER OF SCIENCE**  
**In**  
**MARITIME AFFAIRS**

**(MARITIME SAFETY AND ENVIRONMENT ADMINISTRATION)**

2019

## DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): .....

(Date): .....

Supervised by: **1<sup>st</sup> Jens-Uwe Schröder-Hinrichs,**  
**2<sup>nd</sup> Peter Raneri**

World Maritime University

## ACKNOWLEDGEMENTS

First of all, I really appreciate the opportunity to invest my time in World Maritime University and live in Malmö, Sweden. If somebody asks me how life in Sweden was, I will tell them that Sweden is my second home country and that Malmö is my overseas hometown. Moreover, my precious colleagues, as well as the Professors at WMU gave me the genuine opportunity to piece my knowledge together precisely and widely; this experience has opened my eyes and horizons bigger and wider.

Likewise, I would like to thank my 1st supervisor, Professor Schröder and 2nd supervisor, Mr. Raneri for their guidance in writing my dissertation and providing myself and colleagues in the MSEA specialization with the opportunity to expand our knowledge to the wider ocean. Furthermore, I must express my sincere gratitude to those who participated in my dissertation survey from S. Korea and Europe for sharing their precious time, knowledge and experience. Their responses helped me to propose a lively, useful solution for a safety and facilitation issue and contribute to the development of the industry.

I would like to thank my fellow Koreans living in Malmö as they have helped me live a fruitful life, even in such a remote place. We have enjoyed friendship and companionship through thick and thin and in particular, I would like to express special thanks to good persons, Mr. Ju and Mr. Choi who are filled with passion and wisdom.

Lastly, I have to express my wholeheartedly sincere gratitude to my family who had to overcome a difficult beginning in unfamiliar circumstances but eventually achieved success in their lives here. Sometimes, we agree that life in Sweden has been the turning point for us to rediscover the importance and true meaning of family, providing us with quality time spent together and allowing us to get to know each other even better than before. I would like to thank my mom, brothers and sisters living in my home country for waiting for me all this time. They give me confidence and love wherever I am. Bon voyage!

# **ABSTRACT**

**Title of Dissertation: Policy research on the development of Port Operation Service in response to the growing needs of the cruise industry in South Korea**

**Degree: MSc**

The increasing size and number of cruise ships and passengers provide economic profits to local cities as well as the country itself. However, this trend could bring about new challenges such as an increased safety risk, the immigration process not meeting the expectations of passengers and other issues which hinder the growth of the industry. In order to attract the cruise industry further to S. Korea, these challenges should be identified and solved in a timely and proper manner.

Therefore, this dissertation examined which aspects amongst various port operation services should be prioritized in order to best meet the growing demands, perception of the safety risk of cruise ships in port and the implementation of sufficient safety measures in Busan and Incheon ports in S. Korea. The proposals of additional safety services were made to optimize the cruise ship safety in the ports through the survey and participation of the author on board a cruise ship.

Moreover, to facilitate the growing number of passengers going through the passport control gate, the dissertation identified the gap between desirable and actual time of immigration from participants and proposed realistic ways, which contribute to improving the immigration process, for example, the introduction of standard port formality to connect the information with adjacent countries. In order to accomplish the above goal, the author chose to utilize research methodologies such as comparative analysis through the survey to the professionals about port operation services between S. Korea and Europe. In addition, the author spent 10 days on board a cruise ship to reflect on the actual situation.

Consequently, the paper proposes the need to prepare for cruise ship environmental service in port, the consideration of additional safety measures and the introduction of an integrated system to facilitate the immigration process and contribute to the sustainable development of the cruise industry in S. Korea as well as Northeast Asia.

**KEYWORDS: Cruise industry, Cruise ship, Port operation, Safety, Immigration**

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## LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
CLIA	Cruise Lines International Association
EC	European Commission
EMSW	European Maritime Single Window
GT	Gross Tonnage
IMO	International Maritime Organization
MA	Maritime Authority
MOF	Ministry of Oceans and Fisheries
MSW	Maritime Single Window
NMSBP	National Maritime Safety Master Plan
NCL	Norwegian Cruise Line
NEAL-NET	Northeast Asia Logistics Information Service Network
OI	Operational Incident
PA	Port Authority
SAR	Search And Rescue
SOI	Significant Operational Incident
SW	Single Window
VTs	Vessel Traffic Service
WCO	World Customs Organization

# 1. INTRODUCTION

## 1.1. Background

The growth rate of the global cruise industry has been increasing at a faster rate than ever before; the global demand for cruising reached 26.7 million passengers in 2017, up 61 percent from 17.8 million passengers in 2009 (Cruise Lines International Association [CLIA<sup>1</sup>], 2018). Furthermore, the number of cruise passengers visiting S. Korea reached 1.95 million in 2016, up approximately 60 times from 0.03 million in 2005 (Ministry of Oceans & Fisheries [MOF], 2017).

In the meantime, the size of cruise ships<sup>2</sup> has gradually become larger to accommodate more passengers and amenities, from *RMS Titanic* having a tonnage of just over 46,000 GT and a capacity of 2,435 passengers to the 2010 maiden voyage of the *Allure of the Seas* coming in at 225,000 GT and a 6,296 maximum passengers capacity (David Mc, 2016). In 2018 Royal Caribbean unveiled the *Symphony of the Seas* measuring 368 metres in length accommodating a maximum capacity of 6,680 passengers. The cruise industry is expected to reach 30 million voyagers in 2019 (CLIA, 2018), up 5.3 % from 28.5 million in 2018 (CLIAa, 2019).

The growing cruise industry provides tourism society with substantial economic benefits such as local tourism expenditure and extensive employment opportunities. It is estimated that approximately 5 billion dollars in revenue and 25,000 people are employed in 2016 as a result of cruise industry in S. Korea (MOF, 2017). Furthermore,

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1. "CLIA Cruise Lines represent more than 95 percent of global cruise capacity" (CLIAb, 2018).

2. "a large ship that carries people on voyages for pleasure, typically calling in at several places (Oxford dictionary, 2019)".

the activation of cruise tourism is relevant with task 73 “To expand tourism welfare and revitalize the tourism industry” of one hundred policy tasks of President Moon Jae-in Administration from 2017 to 2022 (Cheong Wa Dae, 2017).

However, the increase in number and size of cruise ships could be a safety threat, increasing both the possibility and consequences of accidents (IMO MSC-MEPC<sup>3</sup>, 2018). Furthermore, it can also pose significant risks to the environment as well as inconvenience to passengers by delaying the immigration process. For example, cruise shipping companies have been seeking improved passenger immigration convenience and simplicity of the immigration process for many years (Hwang, Jin-hoi., 2017).

In this regard, the growing number and size of cruise ships having a large number of passengers entering port are likely to require special port operation services like additional vessel traffic management, greater capabilities for port reception facilities and faster immigration processing. Unless proper measures to respond to this growth are carried out ports could potentially face a decline in the cruise industry with catastrophic consequences including large scale marine casualties and a loss in credibility and reputation leading to massive reductions in revenue. Therefore, it is highly necessary to carefully review the framework of port operation services to better attract the cruise industry going forward. These port operation services are important factors in determining the attractiveness of cruise ship homeports and influencing their choice of port destinations (Lekakou, et al., 2009).

This research will review port operation services to assess and increase their appeal to cruise ship operations. Moreover, this research will explore how to best facilitate safe and efficient movement of a rapidly increasing number and size of cruise ships that are calling at the ports of Busan, the largest port, and Incheon, the second largest

---

3. Risk = Probability × Consequence; Probability means the relative frequency that an event will occur, Consequence means the outcome of an accident.

port as well as the closest port to the capital of S. Korea. Hopefully, this research will contribute to promoting the development of the cruise industry.

## 1.2. The implications and new challenges of the cruise industry

In S. Korea, the number of cruise ship passengers reached 1.95 million in 2016, which was up 86 % from 1.05 million in 2014 and up about 60 times from 0.03 million in 2005 as shown in Figure 1 (MOF, 2017). In 2016, foreign-flagged cruise ships entered Korean ports 791 times, including 68 massive cruise ships of over 150 thousand tons leading to contributions in the local economic growth and employment expansion (MOF, 2017). In April 2019, a new exclusive terminal for cruise ships in port of Incheon was opened near the capital city of Seoul. The terminal is the largest of its kind in South Korea capable of accommodating ships of 225,000 GT, one of the world largest cruise ships with about 8,500 passengers and crew (MOFa, 2019).

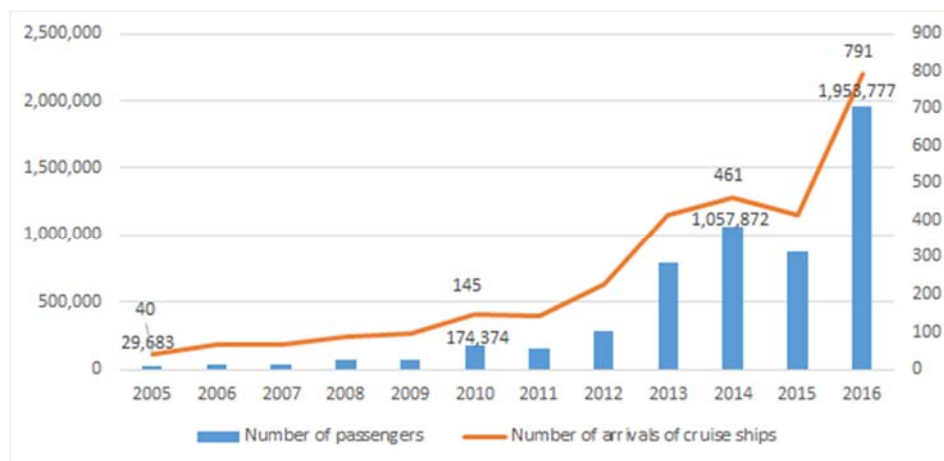


Figure 1. Trend of number of visiting passengers and cruise ship arrivals in S. Korea. Adapted from MOF. 2017.

The growth rate of the global cruise ship market has been increasing at a faster rate than ever before. For example, 18 new CLIA member ocean lines will be debuted in 2019 and 272 cruise ships are expected to sail around the world (CLIA, 2018). The cruise ship industry has had significant impact on the global economy, creating \$134 billion in total worldwide output (CLIA, 2018). In addition, the economic benefit of cruise tourism in S. Korea, as shown in Table 1, reach approximately \$5 billion dollars annually and employs about 25,000 people in 2016 (MOF, 2017).

Table 1

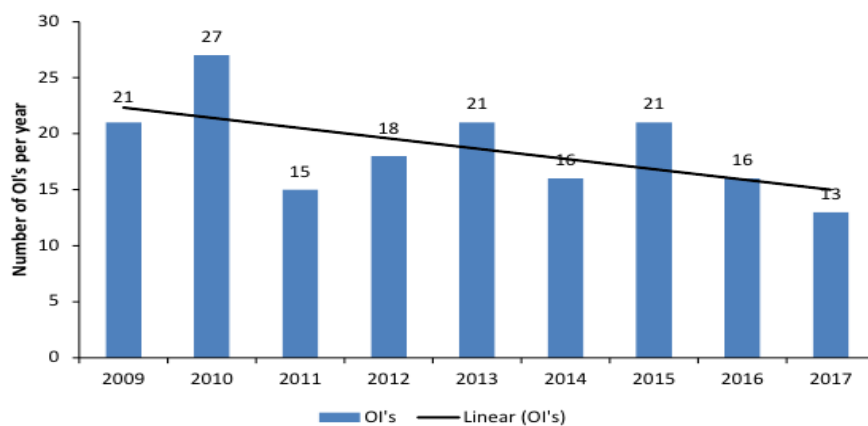
*Economic benefit of the cruise industry in 2016*

Division	Effect	Remarks
Total	About \$5 billion / 25,000 persons employed	-
Local consumption expenditure	About \$2 billion	-Tourism and shopping \$1.9 billion -Port dues \$18 million -Ship stores \$10 million
Production inducement effect	About \$3 billion	-About \$2 billion x 1.6840(inducement coefficient)
Employment inducement effect	About 25,000 persons	-About \$2 billion x 0.0121(employment inducement coefficient)

*Note.* Adapted from MOF, 2017.



Despite the growing trend of the cruise industry, according to worldwide statistics of Operational Incidents (OI<sup>4</sup>) of cruise ships, accidents involving cruise ships have been in a downward trend both at sea and in port (G.P. Wild [GPW], 2018). A report by Cruise Line International Association (CLIA) shows “Even though the capacity of cruise ship fleet has grown by 41.6 percent since 2009, the number of “Significant Operational Incidents (SOI) has declined: from 2009 to 2017, SOI have been on a downward trend with an average of 18.7 incidents a year, down from a seven-year average of 19.9 in 2015 and 19.4 in 2016” (GPW, 2018). SOI is defined as an incident “in which the ship suffers more than 24-hours delay to the published itinerary; fatalities occur to either passengers or crew, or a serious injury occurs to either passengers or crew” (GPW, 2018).



Source: G. P. Wild (International) Limited

Figure 2. Worldwide statistics of Operational Incidents of Cruise ships (2009-2017)

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4. Four Operational Incidents (OI) include Fire; Technical breakdown such as engine failure; Stranding or grounding; Passenger missing overboard and not recovered; Storm or wave damage, Collision/allusion; and sinking.

However, there have been recent cases of accidents, for example on March 23, 2019 the cruise vessel, *Viking Sky's* engine shut down in Norwegian territorial waters due to a technical failure with 1,373 people on board (Accident Investigation Board Norway [AIBN], 2019). Passengers had to endure extreme weather conditions before the ship finally arrived at the port of Molde on Norway's west coast ("Viking sky: Inspection", 2019). In another incident the "*MSC Opera*" with the capacity of 2,679 passengers crashed into a tourist boat in Venice, Italy on June 2, 2019 because of engine failure. On May 29, 2019 the "*Viking Sigyn*" a river cruise ship, had a fatal collision with a tour boat on the Danube River, Hungary resulting in the deaths of 28 persons. This series of recent accidents shows that even when equipped with the newest technology, the safety of cruise ships cannot be ensured. Likewise, new unforeseen challenges from the quick growing industry might further hinder its forward development.

In addition, while "Mega ships" may promise greater efficiencies they also bring new risks and challenges when performing salvage operations in the event of an accident" (Allianz Global Corporate & Specialty [AGCS], 2018). In April 2017, *MSC Daniela*, a 13,800-TEU container ship, demonstrated the risk that mega ships bring. The vessel was on fire for more than a week and had to enter a dock for repair, proving that the size of a ship alone certainly does not ensure safety. Therefore, in order to develop a sustainable cruise industry in S. Korea, port operation services for cruise ships having a capacity of over 5,000 passengers are likely to require stronger, more tailored port safety and efficiency services such as the VTS service and alterations to the immigration system to sufficiently ensure the safety and satisfaction of passengers visiting Korean ports.

### **1.3. Objectives**

This study aims to identify the current situation in relation to port operation service factors and evaluate these factors to best facilitate the safe and effective movement of cruise ships in response to the growing need of cruise industry in ports of S. Korea. Furthermore, it seeks to make policy proposals to improve these services with the goal of stronger port attractiveness. Additionally, considering that cruise ships choosing Incheon port tend to make ports of call in China and Japan both before and after the entry into Incheon due to their close geographic location, this dissertation aims to identify the common factors needed to respond to the growth of the Asian cruise ship industry as a whole in collaboration with adjacent countries.

Accordingly, this dissertation intends not only to promote the safe and effective movement of cruise ships in Incheon Port, S. Korea, but also in other East Asian countries. By identifying common factors amongst adjacent countries, China and Japan, this research aims to promote the growth of the Asian cruise ship industry as a whole and make proposals for programs such as a uniform immigration service. For that purpose, after looking through the framework and examining the current state of port operation services for cruise ships, recommendations on areas in need of improvement will be chosen corresponding to the growing needs of the cruise tourism industry. Therefore, this dissertation:

- Review port operation services for cruise ships and identify factors in need of improvement in response to the growing needs of the cruise industry
- Analyse and evaluate the factors which were identified and determine how best to facilitate safe and efficient movement of cruise ships calling at the ports of Busan and Incheon.
- Reviews the chosen factors by comparing and contrasting the port operation services between the Europe and S. Korea.
- Makes realistic proposals to upgrade port operation services and contribute to the development of the cruise tourism industry.

- Justify why the proposals should be carried out for sustainable development of the cruise ship industry

#### **1.4. The structure of the dissertation**

This study consists of seven chapters. Chapter one includes the background, objective and structure of the thesis. It also introduces trends of the cruise industry.

Chapter two will describe the framework of cruise port operation services and identify factors warranting further discussion.

Chapter three will research and determine the current status of safety measures implemented in the port of Busan and Incheon and the immigration process for cruise passengers in S. Korea.

Chapter four will explain the research methodology and explore which lessons can be learned from Europe's cruise industry. A questionnaire was developed for S. Korea and Europe respectively and the subject of the author's participation on board a cruise ship voyage will be discussed.

Chapter five will discuss the comparative findings on safety measures and immigration between Europe and S. Korea. It will compare and analyse the data collected through the survey, literature review and observations made by the author, and will also examine the reliability and validity of the data.

Chapter six will aim to make useful proposals, identified through the findings, to improve port operation services and attract the cruise ship industry. The chapter will also propose additional safety measures and immigration strategies to maximise safety and efficiency.

Lastly, chapter seven will provide conclusions and limitations of the dissertation as well as possible areas for further study.

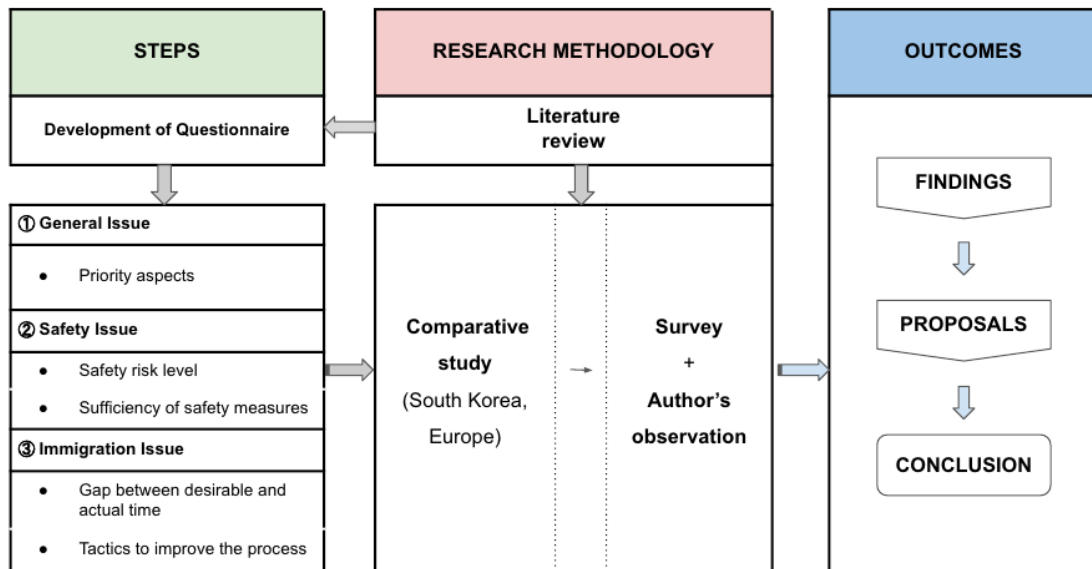


Figure 3. Overall structure of the study

## 2. FRAMEWORK OF CRUISE PORT OPERATION SERVICES

### 2.1. Importance of port operation services as cruise port

There are various requirements for ports in which cruise ships call, which in general, the requirements compose port service, traffic accessibility and tourism. In particular, the most basic determining factor for cruise ship companies in selecting their itineraries is port service such as technical support like navigation and towing service to cruise ships, passenger support like welcome event and overall safety level of the port (Korea Maritime Institute [KMI] & Korea Culture & Tourism Institute [KCTI], 2015).

As illustrated in Figure 1, as of 2016, the number of passengers on cruise ships visiting S. Korea reached 1.95 million and foreign-flagged cruise ships entered cruise ports 791 times including 68 massive cruise ships (MOF, 2017). According to CLIA (2018), 30 million global ocean cruise passengers are expected to cruise in 2019, up 68.5 percent from 17.8 million in 2009 and 18 new CLIA-member cruise lines will debut in 2019. This surge in new cruise lines is not necessarily surprising given the average age of cruise ships reaches 47 years old (CLIAa, 2019). The cruise ship industry has had a significant impact on the global economy; it has created \$134 billion dollars in total output worldwide including 1,108 thousand jobs and \$45.6 billion in wages. Moreover, the positive trend in cruise popularity is expected to keep growing up to 37.6 million passengers globally in 2025 from 26.9 million in 2018. Furthermore, the Asia-Pacific in particular will observe an explosive growth of the industry thanks to the region's economic development and relatively stable international environment (Wang, Shi, & Mei, 2019).

In this respect, considering the recent trend of growth of the cruise industry, the rapid increase in the number of cruise ships and passengers increases the risk of accidents and can inconvenience passengers. This brings a new challenge for the Maritime Administration and Port Authority in Busan and Incheon. Moreover, average daily vessel traffic along the coast of Korea is already seeing in excess of 16,600 vessels and the risk of maritime accidents still exists due to highly active sea trade as well as complex and diverse traffic environment including marine leisure (MOFb, 2017). This means that they should have proper and sufficient measures to prevent

accidents and take proactive measures to mitigate the risks. Moreover, the increase in passengers could result in longer immigration waiting times and significantly cause inconvenience to passengers, which may hinder the development of the cruise industry.

Taking into account recent cruise accidents, there is a compelling need to take a close look at port operation services. For example, two Holland America Line cruise ships collided at the port terminal of Vancouver, Canada on May 4, 2019. Two MSC sister ships collided at the port of Buenos Aires, Argentina on February 20, 2019, reportedly due to the steering loss of control from one of two ships while maneuvering. The *Viking Sky* experienced a black-out caused by low engine oils level off the coast of Norway. There were harsh weather conditions and as a result, the passengers suffered greatly. The image of safety and quality of experience on board a cruise ship is influenced by the perception of passengers and therefore it is important to maintain safety and service levels in line with the growing demands of cruise ships and their customers.

Moreover, considering the relatively short time spent in port by cruise ships visiting S. Korea, ranging from 6 to 9 hours (KMI & KCTI, 2015), the immigration time could be a very important factor influencing the decision on selection of port of call from the viewpoint of both the shipping company and passengers since time spent at immigration reduces the amount of leisure time (Incheon Port Authority [IPA], 2019). Consequently, these factors affect the selection of cruise ships and therefore, it is crucial to further develop these factors in order to respond to cruise industry growth in S. Korea.

## **2.2. Requirements of port operation services as cruise port**

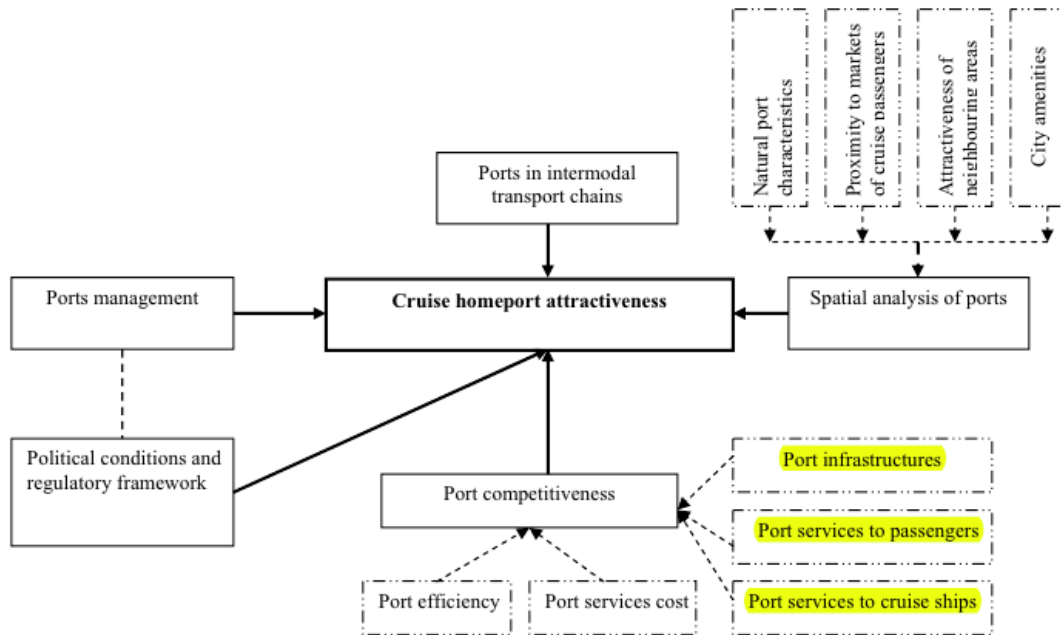


Figure 4 Framework of cruise homeport attractiveness. From Lekakou, M. B. et al., 2009.

The attractiveness criteria of cruise homeport are determined by a variety of factors as illustrated in Figure 4; port operation services are summarized to include port infrastructures, port services to passengers and port services for cruise ships among many other factors (Lekakou, et al, 2009). In the case of port operation services, there are no large differences between homeport and secondary port. In addition, in order to be a port of call for cruise ships, the ports must be able to meet basic requirements both from the perspective of the shipping company as supplier and the passenger as demander (KMI & KCTI, 2015).

### 2.3. Factors that should be identified with high priority

Theoretically, the increase in number and size of cruise ships going in-bound and out-bound from the port raises the safety risk, but remains relatively unknown the



question of how much the overall safety of the port is affected. By way of example, an accident can cause loss of life, pollution and economic loss. In particular, it may cause a large number of casualties since a recently built cruise ship can accommodate as many as 5,000 passengers or even beyond. When considering the impact of an incident, safety measures such as Vessel Traffic Service (VTS), Pilotage and the designation of safe speed should be implemented and checked.

According to various sources, the immigration process is considered one of the principal elements that requires improvement in response to the growth of the cruise industry. According to the Korea Maritime Institute (KMI), cruise shipping companies and related agencies are asking for greater simplicity of the immigration process and continue to increase the demand for immigration convenience for passengers (Hwang, Jin-hoi., 2017). As stated in paragraph 2.1, immigration processing time affects the leisure time of passengers, particularly in the case of a short stay in port, as such, processing times can certainly influence the choice of cruise ship companies as to which ports of call they place on their itinerary. In this respect, the immigration process in S. Korea should be analysed to determine if it is operated properly and sufficiently in comparison with other developed international cruise ports.

When determining the desirability of a cruise port the two aforementioned factors of immigration and safety are extremely critical, however, there are other factors to consider, such as ship and passenger security according to the International Ship and Port Security (ISPS) Code. In addition, these include ship environmental and waste management services (port reception facilities) and infrastructure including exclusive terminals and dedicated berthing areas for cruise ships, therefore, which will be included in the questionnaire of the survey to find out the factors that should be prioritized to meet the growing demands of the cruise industry.

### **3. CURRENT MEASURES**

The increased number and size of cruise ships have brought about change in port operation services in S. Korea. Examples of this include the implementation of new safety measures for cruise ships, the strengthening of immigration processes, and the contribution of a new cruise ship terminal in Incheon. However, there is still uncertainty as to whether these types of measures should be considered an appropriate and sufficient system. In this regard, it is necessary to review the main safety and immigration measures currently being used in S. Korea and Europe. I aim to discuss these measures and ultimately propose constructive ideas to develop them. Through creative review as well as compressive surveys which will be distributed to cruise industry representatives and various port management officials in S. Korea and Europe. This can be done by comparing and analyzing the various measures, which the questionnaire and research method will cover in Chapter 4.

#### **3.1. Maritime safety measures for cruise ships in S. Korea**

Year	Indonesia	Thailand	Philippines	Hong Kong	Burma	South Korea	Japan	China	Malaysia	Total	Year	Indonesia	Thailand	Philippines	Hong Kong	Burma	South Korea	Japan	China	Malaysia	Total
2014	1	0	0	0	0	0	0	0	0	1	1992	0	0	0	0	0	0	0	0	1	1
2013	0	1	1	0	0	0	0	0	0	2	1991	0	0	0	0	0	0	0	0	0	0
2012	1	0	1	1	1	0	0	0	0	4	1990	0	0	0	0	0	0	0	0	0	0
2011	1	0	1	0	0	1	2	0	0	5	1989	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	1988	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	1987	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	1986	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	1985	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	1	0	0	0	0	1	1984	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	1	0	1	1983	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	1982	0	0	0	0	0	0	0	0	0	0
2003	1	0	0	0	0	0	1	2	0	4	1981	0	0	0	0	0	0	0	0	0	0
2002	2	0	1	0	0	0	2	0	0	5	1980	0	0	0	0	0	0	0	0	0	0
2001	0	0	1	0	0	0	0	2	0	3	1979	0	0	0	0	0	0	0	0	0	0
2000	1	0	4	0	0	0	3	0	0	8	1978	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	1977	0	0	0	0	0	0	0	0	0	0
1998	1	0	1	0	0	0	1	1	0	4	1976	0	0	0	0	0	0	0	0	0	0
1997	2	0	1	0	1	0	1	1	2	8	1975	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	1974	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	1973	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	1972	0	0	0	1	0	0	0	0	0	1
1993	0	0	0	0	0	0	0	0	0	0	Total	10	1	11	2	3	1	10	7	3	48

Figure 5 List of cruise ship accidents occurring in the Asian region from 1972 to 2014. From Table, Yip, Tam, Ng & Nguyen, 2017.

According to Figure 5, there has only been one “cruise ship” accident in the S. Korean region. However, this collision occurred between a cargo ship and an internationally-bound passenger vessel transporting passengers from S. Korea to China and vice versa (Korea Maritime Safety Tribunal [KMST], 2011) and it must be noted that the involved ship was not technically a cruise ship for its purpose but rather a passenger ship being defined as a passenger ship carrying more than twelve passengers according to IMO SOLAS 1/2 (IMO, 2019). Therefore, it can be argued that there have been no accidents in relation to cruise ships within S. Korean waters.

In spite of that, MOF has implemented various maritime safety measures to prevent and mitigate the risk of accidents in port. The maritime safety measures have been implemented using a 3 tiered system, which is divided into the National Maritime Safety Master Plan (NMSBP) (5 years’ validity) as the top hierarchy, annual National Maritime Safety Implementation Plan (NMSIP) under the NMSBP and finally local safety measures implemented by each regional office to reflect the characteristics of

the vessel traffic environment. NMSBP and NMSIP are based on the Act of Maritime Safety while the local offices use official notices such as Maritime Traffic Messages to distribute safety information. With regards to cruise ship safety, the 2nd NMSBP (2017~2021) and 2019 NMSIP do not address the safety of cruise ships directly but instead, regional offices include various special safety measures for cruise ships in collaboration with stakeholders like pilots and the port authorities located in Busan, Incheon, Yeosu-Gwangyang and Ulsan city. For example, the Busan's regional maritime office has adopted several special safety measures requiring the use of pilots during inbound and outbound transit additionally, in heavy weather, ships can use a different pilot station for safety according to an administrative notice issued by the local office.

Moreover, Busan VTS has implemented special measures to use one-way or two-way transit according to ship size (VTSC, 2019). For example, if the cruise ship is large in size, the VTS officer cooperates one-way transit in cooperation with the pilot. According to traffic regulations, in the case of passing Busan port bridge, a large cruise ship is only permitted to pass by itself to ensure the safety of passage, without the interruption of other nearby vessels. In Incheon Port, the local office has also adopted additional safety measures for cruise ships such as mandatory on board pilot when transiting in Incheon Port. In an emergency, the local traffic regulations allow the ship to use an emergency waiting anchorage and also requires special ships to increase the use of tug boats for safety. Moreover, the regulation provides a special article to regulate the safe speed of transit to under 8 knots for navigation into the port of Incheon. Table 2 below provides a summary of special measures for the safe movement of cruise ships in Busan and Incheon ports.

Table 2

*Safety measures for cruise ship in port*

Division	Busan port	Incheon port
Local Maritime Traffic regulations	<ul style="list-style-type: none"> <li>● (Pilot) mandatory, P/S different position available in heavy weather</li> <li>● (Waterway) one-way passage according to cruise ship size</li> <li>● (VTS) special monitoring, etc.</li> </ul>	<ul style="list-style-type: none"> <li>● (Pilot) mandatory</li> <li>● (Tug) available for increased use</li> <li>● (Anchorage) available in emergency waiting anchorage in special conditions</li> <li>● (Safe speed) under 8kts (2019. 3), etc.</li> </ul>

*Note.* Adapted from Notice of local office of MOF, etc.,

### 3.2. Immigration process for cruise passengers

According to the immigration office of the Ministry of Justice, the grounds of immigration for cruise passengers is based on article 7 about entry of foreigners and article 14.2 for the permit of touring pass. The procedure and contents of the audit do not differentiate between each cruise port; therefore, the following information now applies to all cruise terminals. As shown in Table 3, in order to have a shore pass for sightseeing, the report of port entry with the information of passengers and crew list should be turned in 24 hours prior to entry to the port of call. Subsequently, the immigration office in charge proceeds to analyze whether passengers are to be permitted for landing. After the ship enters the port, passengers must pass the terminal of the port and immigration officers in the terminal carry out the audit task based on the result of the previous information analysis.

According to the authority, the immigration operation time for 2,500 passengers in gates takes about an hour with 10 immigration officers working in the terminal. Therefore, it would take approximately from two hours to two and half an hour in the

scenario of a cruise ship which carries 5,000 passengers in Incheon cruise terminal. This only means that the time of immigration audit does not include the time taken for passengers to move from the ship to the immigration gate and does not express the time for all passengers to pass the immigration gate from the first to the last passenger (Ministry of Justice [MOJ], 2019.5, 2019.9).

In addition, the authority in charge has been trying to make the immigration process faster and more accurate for passengers to support the vitalization of the cruise industry. For example, entry shore pass with Quick Response (QR) code during immigration began to be issued to certain cruise ships from the first half of 2019, which proceeds the departure review through the scan of the code (MOJ, 2019.9).

Table 3

*Current process of immigration in Incheon cruise terminal*

<b>Division</b>	<b>Current process</b>
Grounds	▶ The Act of immigration management
General procedure	▶ Submit the report with the information of passengers and crew to the authority → the authority analyse the information → immigration audit in terminal based on the information
Time <sup>5</sup>	▶ Based on the immigration audit operation time, it would operate from 2 to 2.5 hours to process 5,000 passengers, where 10 officers work in the case.

*Note.* Adapted from Immigration authority (MOJ, 2019.5, 2019.9).

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5. “the authority provides a rapid immigration screening service covering 3 to 4 passengers per minute based on the pure immigration itself in a gate” (MOJ, 2019.9)

## **4. RESEARCH METHODOLOGY**

### **4.1. The effective method for the research**

In response to the growing need of the cruise industry, port operation services should be developed proactively in S. Korea to attract the cruise industry further. In this regard, it is necessary to identify and evaluate which factors among port operation services should be improved and then propose how the factors should be developed accordingly. For this purpose, two methodologies were chosen to be carried out: comparative study and participation observation. The former is to compare and analyze port operation services of the cruise ports between S. Korea and Europe because the system and opinions from well-developed cruise ports with a longer history in the cruise industry in Europe can be compared with those in S. Korea. In 2018, the number of European ocean cruise passengers reached 7.17 million, up 3.3 percent from 2017 (CLIAc, 2019). “In 2007 Europe accounted for 26 percent of the global cruise market with 4.1 million passengers” sourced from Europe and “this increased to 7.0 million passengers in 2017” (CLIAc, 2018). The comparison between both regions would indicate meaningful findings.

## 4.2. Comparative study

The European region is considered one of the most attractive cruise industries in the world. According to CLIA, the European market represented 25.1 percent among global ocean passengers in 2018 (CLIAa, 2019). In this regard, Europe can be considered as the benchmark region in comparison with S. Korea. Two different types of questionnaire were carried out to determine how much the increase in number and size affects the safety of the port, whether the safety measures implemented are sufficient and how to better facilitate passenger immigration.

In this regard, the questionnaire for S. Korea aimed to identify the most critical port operation services which would require improvement to meet the needs of the rapidly growing cruise ship industry. For Europe, the questionnaire aimed to improve port operation services in South Korea by analysing and comparing the operations and practices of well-developed cruise ship ports in Europe to those in S. Korea.

## 4.3. Research questions

As discussed in chapter 2, cruise ports should provide many port operation services to ships and passengers. However, in order to respond to the growth of the cruise industry, it needs to be determined what kind of factors and how much should be developed to best facilitate the safe and efficient movement of cruise ships and passengers. Moreover, the proper solutions should also be proposed to deal with the factors in need of improvement. In this respect, appropriate questions should be posed and an appropriate research methodology needs to be chosen. The research questions consist of two parts for S. Korea and Europe respectively in accordance with its purpose to carry out the goal of the survey.



Therefore, for S. Korea, the questions will focus on the findings on which factors should be prioritized in response to the rapid growth of the cruise industry in order to identify the factors to improve the attractiveness of cruise ships. The second main question will touch on the perception of safety risk; whether the increasing cruise ships are posing a safety threat and whether the currently adopted safety measures are sufficiently enhancing port safety and if not sufficient, which additional measures should be taken to improve the safety of the port.

Furthermore, with regards to immigration, the question will ascertain the desirable amount of time for immigration agencies to take in processing cruise ship passengers. Considering the increasing size of cruise ships, the scenario of a cruise ship carrying 5,000 passengers and planning to stay in port for 8 to 12 hours according to the recent cruise ship operation patterns will be used. In addition, the last part of the questionnaire will examine which strategies should be introduced to contribute to improvement of the immigration processing time for cruise passengers. The questions as shown in Table 4 deal with the overall perception and awareness of how sufficient the safety measures on cruise ships are and how to improve the immigration processing time for cruise passengers.

Table 4

*Key questions in general and safety issue of the survey*

<b>Division</b>	<b>questions</b>
General	-What factors should be prioritized to meet the growing needs of the cruise industry?
Safety	-How much does the growing number and size of cruise ships affect the port safety? -Do the current safety measures sufficiently enhance the port safety? -What kind of additional port safety services are necessary?

The second part, for cruise ships calling at European ports it is important in gaining a perception of the overall safety of cruise ships, identifying the differences between regions and finding solutions to possible safety problems as well as immigration issues. In this way, it will be clear which aspects of port services in the EU region (according to respondents) should be prioritized in order to best meet the growing needs of the cruise industry. This will be compared and different areas of focus will be chosen to see how much effect the increasing growth of cruise ships poses a safety risk in port of calls. The questions will include whether the European cruise port stakeholders think the special safety measures of cruise ships in and outbound sufficiently enhance port safety given the rapid increase in cruise ship traffic and what additional safety services, if any, are desirable to optimize cruise ships' safety.

For immigration processing time of passengers, the questions as shown in Table 5 will include what the average time needed for immigration is and how much time is desirable for immigration processing in order to attract more cruise ships and passengers into the cruise terminal. Moreover, which strategies such as a standardization of port formality and an integrated system such as Maritime Single Window (MSW) would contribute most substantially to the improvement of immigration processing time.

Table 5

*Key questions about immigration process*

<b>Division</b>	<b>questions</b>
<b>Immigration</b>	-How long does it take for immigration? -How much time is desirable for the immigration process? -Which of tactics would most contribute to improvement?

#### 4.4. Design of the questionnaire

In order to precisely find out the respondents' perception of cruise ship safety and factors which could improve safety, the Likert scale from 1 to 10 was used in a number of questions. This method was used in the same way in both regions to compare and contrast the difference between the beginning and developed stages of the cruise industry. The special safety measures adopted in S. Korea are included in the questionnaire in order to evaluate whether these measures could be considered sufficient to enhance the safety of the port in line with the growth of the cruise industry from the viewpoint of stakeholders in S. Korea and European ports. It is subsequently possible to compare and propose improvements from the European port viewpoint.

Taking into account that the cruise industry is expected to grow in size and the number of cruise ships will increase, the immigration processing time was designed so that a cruise ship with 5,000 passengers on board would stay for approximately 8 to 10 hours in the port of call. Cruise passengers spend 6 to 9 hours in port of calls in S. Korea and it is rare to call for more than one day (KMI & KCTI, 2015). Additionally, in the case of cruise ship schedules in Stockholm, Sweden, in 2018, the average duration of stay in port was about 9 hours (Crew Center<sup>6</sup>, 2018).

The aim of the questionnaire for each region was quite different. However, similar questions such as which factors should be prioritized, the safety risk arising from the growth of the cruise industry and the desirable time for immigration were used to analyze and compare the operations and practices of well-developed cruise ship ports

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6. Note “the *information* presented is based on schedules provided by the cruise lines and as such is subject to the change by the cruise operators” and the average time using the available data was calculated by author.

to those in S. Korea. In addition, the questions for European ports included the use of MSW in the terminal to facilitate the immigration processing time and how much it has contributed to the time of immigration. Considering the end-user of cruise ships and terminals, the opinion of passengers on board the cruise ships was the most important factor to be considered to draw the real proposals to attract passengers. Therefore, the questionnaire was designed for passengers to listen to their real experience and ideas. The survey items are attached in the Appendix A, B and C of this dissertation.

#### 4.5. Case study – Author’s observation

The author chose the cruise ship planning to call at four EU countries within the Schengen agreement which covers “26 countries<sup>7</sup> and one non-EU countries to compare and analyse the differences in immigration services between the regions and safety measures for cruise ships in the destinations illustrated in Figure 6. Therefore, the Norwegian Getaway, luxurious floating hotel of the case study was chosen to show the examples of EU member states within the Schengen agreement and non-EU member states outside the agreement as seen in Table 7.

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7. Austria, *Hungary*, Norway, Belgium, Iceland, Poland, Czech Republic, Italy, Portugal, Denmark, Latvia, Slovakia, Estonia, Liechtenstein, Slovenia, Finland, Lithuania, Spain, France, Luxembourg, Sweden, Germany, Malta, Switzerland, Greece, Netherlands.



Figure 6 Voyage plan of Norwegian Getaway (31/7 to 9/8/2019). From NCL.

Table 6

*Norwegian Getaway's particulars*

GT	145,655	Overall Length	1,068 feet
Built	2014	Width	169.7 feet
Guest capacity	3,963 (double occupancy) *4,800 for this voyage <sup>8</sup>	Crew	1,646

*Note.* Adapted from NCL.

Moreover, regarding the immigration process, the case study could be an effective way to identify and evaluate the appropriateness of immigration processing time from

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8. For this voyage, the gate security officer of the vessel said that about 4,800 passengers are on board.

the passenger viewpoint. The introduction of the method arose from how an EU member states could handle the immigration process and how to facilitate the issue. According to EU directive 2010/65/EU, member states have introduced Maritime Single Window (MSW) to facilitate, for example, cargo handling by rationalizing reporting formalities such as notification for ships arriving in and departing from ports of the EU member states and border checks on persons across borders required by Schengen Borders Code (Wawruch, 2015). The actual case study on board cruise ships could show how this kind of system plays a role as a facilitator.

Table 7

*Overall schedule of Norwegian Getaway of the voyage*

Day	Cruise ports	① Arrival	② Departure	③ Stay time (①-②)	④ Reduction time <sup>9</sup>	⑤Actual stay time (③-④)
31/July/19 (Wed)	Copenhagen , Denmark	-	5:00 PM	Homeport	-	Departure
1/August	At Sea	-	-	-	-	At sea
2/August		6:00 PM	Overnight	6 hours	40 ~ 130 minutes	4 to 5 hours

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<sup>9</sup> From the author's view, he reduction time (about 50 to 130 minutes only in St. Petersburg or about 80 minutes in the other ports; All passengers must be on board 30 minutes prior to the departure of the cruise(no need for 1st day of St. Petersburg), ship's clearance time from Port Authority after its arrival (about 10 minutes, no need for 2nd day of St. Petersburg) and immigration time (in St. Petersburg, 1st day: about 30 minutes to 2 hours, 2nd day 20 minutes based on round trip in terminal) or Movement time in the other ports (about 40 minutes based on round trips)

3/August (Sat)	St. Petersburg,	-	7:00 PM	19 hours	50 minutes	18 hours 10 minutes
4/August (Sun)	Helsinki, Finland	8:00 AM	5:00 PM	9 hours	80 minutes	7 hours 40 minutes
5/August	Tallinn, Estonia	8:00 AM	5:00 PM	9 hours		7 hours 40 minutes
6/August	Stockholm, Sweden	8:15 AM	4:40 PM	8.5 hours		7 hours 10 minutes
7/August	Visby, Sweden	8:00 AM	5:00 PM	9 hours		7 hours 40 minutes
8/August	at Sea	-	-	-	-	At sea
9/August (Fri)	Copenhagen , Denmark	7:00 AM	-	Homeport	-	Arrival

*Note.* Adapted from NCL & author's observation

In this case, participant observation is a good way to discover the real time in a real situation with the practical feeling and evidence in each terminal, which could also be used to support the findings and proposals in developing the immigration process in S. Korea. Furthermore, it is possible to collect the data from the passengers on board who could have had a different experience in each terminal.

## 5. FINDINGS

## 5.1. Demographic characteristics of respondents

The survey for comparative study had been conducted from July 1 to August 31 with maritime professionals throughout South Korea and Europe, who have expertise in the areas of port management and/or ship safety and/or cruise ship operations. Excluding the unanswered questionnaire, the questionnaire of 90 respondents was used to analyse and compare both regions and make some proposals to meet the growing needs of the cruise industry in S. Korea.

Table 8

### *Demographic characteristics of respondents*

Division		No. of participants	Avg. years of service	General		Safety service		Immigration service	
				No	Avg.	No	Avg.	No	Avg.
Total		90	-	62	17.1	62	17.1	79	-
Europe	Sub-total	44	-	16	25.5	16	25.5	33	-
	MA & PA	12	25.5	12	25.5	12	25.5	4	20.5
	Port service provider (Pilot, etc)	2	22.5	2	22.5	2	22.5	-	-
	Port user (passengers, etc.)	30	-	2	28.5	2	28.5	29	-
S. Korea	Sub-total	46	14.5	46	14.5	46	14.5	46	14.5
	MA & PA	30	13	30	13	30	13	30	13
	Port service provider (Pilot, etc)	11	20.4	11	20.4	11	20.4	11	20.4



	Others (Researcher, etc.)	5	9.7	5	9.7	5	9.7	5	9.7
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The total average years of work experience could not be used because of the lack of information from passengers as tourists on the NCL Getaway who joined the questionnaire about the immigration service of her port of calls. However, except for the immigration service section, the average working years of participants responding in general and safety service was 17.1 years, which means they could be regarded as professionals in the maritime field. In terms of the responses in Europe, the total average years was not available due to the same reason as above, but not including the immigration service section, where the average was 25.5 working years. The average years of those who work in Maritime Authority & Port Authority (MA & PA) was 25.5 years in general and safety service section of the survey.

In S. Korea, the average years that respondents had worked in the industry was 14.5 years and the average years of MA & PA, port service provider and others was 13, 20.4 and 9.7 years respectively. Maritime Administration and Port Authority are amongst the largest majority of participations in the survey. The port authorities are take most of the port operation services in their ports with the exception of some factors like the safety services assigned to the local office of Ministry of Land and Fisheries (MOF) as Maritime Administration. The next highest respondent is port operation service providers such as pilots. The average working years of port service providers such as pilots and VTS operators was shown to be the highest at 20.4 years.

## 5.2. Reliability and validity of the data

The overall average working years of respondents was higher than 17 years. In Europe, in particular, most respondents consist of those who work in MA & PA, except for the immigration service part whose average work experience was 25.5 years in general and safety service sections. Moreover, in the case of passengers among respondents, the author directly interviewed respondents and received answers from 28 cruise passengers on board NCL Getaway. 15 participants excluding the 28 cruise passengers and 1 professional seafarer at sea were working in Denmark, Germany, Norway and Sweden. The countries where these participants work are known as major source passengers' volume for the top countries in Europe (CLIAe, 2019) and they are also included in the IMO Council member states (IMOa, 2017).

Likewise, from S. Korea, the average working years of respondents was 14.5 years and the respondents consist of those who work in MA & PA, Port service providers and others. Most of the respondents were comprised of public workers in MA & PA, representing 65.2 percent. Furthermore, the respondents of port service providers have 20.4 average years' experience. In summary, considering the average working years and workplaces, etc., the data from the survey can be considered to be reliable and valid for this research.

### 5.3. Data analysis from general and safety issue

#### 5.3.1. The priority of port operation services to meet the growing needs of cruise industry

Table 9 shows what should be put into high priority to satisfy the increasing requirements of the cruise industry from the viewpoint of participants in the survey.

Table 9

*Priority of port operation services*

Division	Ship safety service		Immigration service		Security measures		Ship Environmental service		Infra-structure		Other		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Total number	24	<b>22.2</b>	22	<b>20.4</b>	10	9.3	15	13.9	34	<b>31.5</b>	3	2.8	108	100
Europe	5	<b>14.7</b>	2	5.9	5	<b>14.7</b>	11	<b>32.4</b>	9	<b>26.5</b>	2	5.9	34	100
S. Korea	19	<b>25.7</b>	20	<b>27.0</b>	5	6.8	4	5.4	25	<b>33.8</b>	1	1.4	74	100

Overall, they chose infrastructure as the most crucial aspect to meet the growing demands, safety service as second and immigration service as their third preference. Moreover, both regions put infrastructure and safety services within their top three priorities. However, each region shows different opinions in some regards. In Europe, they consider environmental service as the highest priority, while the issue was considered the lowest in S. Korea. The next aspect is infrastructure with 26.5 percent. The immigration issue ranks last with only 5.9% of responses. The author could observe the reason that the destinations of the NCL Getaway had no immigration process except for in St. Petersburg was because the vessel started its voyage from Copenhagen as a homeport. Denmark is among the EU member states within the Schengen agreement which covers “26 countries ("Schengen States") without border controls between them” (EC, 2019). Table 10 explains their main reasoning for prioritising the port operation factors.

Table 10

*Proposals made by participants from Europe*

①Environment	<ul style="list-style-type: none"> <li>-Time to discuss cruise shipping environmental footprint critically in Europe.</li> <li>-Larger terminals are needed to handle the increased amount of guest and logistics needed around the call. Larger ships also put extra effort on ports to handle generated waste.</li> </ul>
②Infrastructure	<ul style="list-style-type: none"> <li>-Both environmental management and infrastructure are lagging behind when the number of cruise calls and the size of the vessels are growing.</li> </ul>
③Safety	<ul style="list-style-type: none"> <li>-The customers are very sensitive to its negative news from the cruise industry, e.g., <i>MSC Opera</i> crash in Venice, <i>Viking Sky</i> black out off Norway, <i>Viking Sigri</i> collision at a river in Hungary.</li> </ul>

The respondents from S. Korea think that the highest priority is the infrastructure including an exclusive terminal, and second is improved immigration services as illustrated in Figure 7. Ship safety services such as VTS was ranked as the third priority to be developed for the cruise industry.

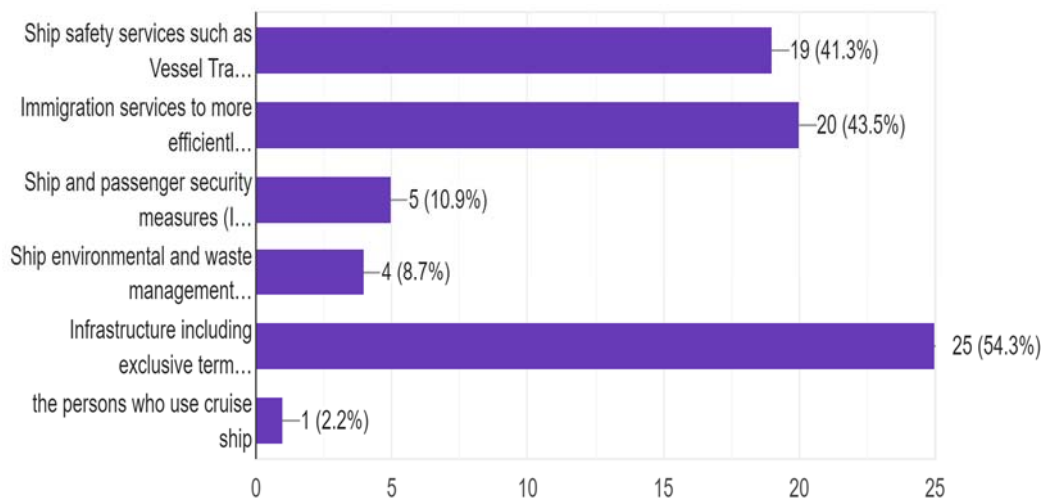


Figure 7 The effect on each factor for the safety risk in port. From the survey.

However, unlike the result of Europe, the immigration service aspect was included as the second highest in S. Korea and the ship environmental service part was chosen as the lowest. The main reasons of respondents are shown in Table 11.

Table 11

*Proposals made by participants from S. Korea*

① Infrastructure	-The first consideration of ship owners would be accommodation for cruise ships. The bigger the cruise ships become, the more obstacles exist on their way.
□ Immigration	-Quick and efficient immigration procedure is the first impression for the passengers.
□ Safety	-Even if cruise ships navigate with caution, they can approach many kinds of ships. Therefore cruise ships should share information with VTS for their safety.

### 5.3.2. The risk perception on each factor affecting the safety of cruise ships

If the number and size of cruise ships grow, the risk of safety increases. Unlike the expectation of the author having had the opinion of the range of high level, the real opinion of the respondents about its risk shows that the overall safety showed 4.4<sup>10</sup>, representing less than the medium. It is, however, close to the medium risk level as shown in Table 12. Likewise, the figures of both regions were shown to be quite similar.

Table 12

*Effect on each factor about safety risk*

Division	Overall safety			Fire			Machinery / electronics failure			Stranding or grounding			Collision or allision			Marine pollution		
	No	Sum	Avg.	No	Sum	Avg.	No	Sum	Avg.	No	Sum	Avg.	No	Sum	Avg.	No	Sum	Avg.
<b>Total</b>	61	266	<b>4.4</b>	61	212	3.5	62	213	3.4	62	250	4.0	61	262	4.3	61	252	4.1
<b>Europe</b>	16	71	<b>4.4</b>	16	56	3.5	16	65	4.1	16	70	4.4	16	69	4.3	16	<b>77</b>	<b>4.8</b>
<b>S. Korea</b>	45	195	<b>4.3</b>	45	156	3.5	46	148	3.2	46	180	3.9	45	<b>193</b>	<b>4.3</b>	45	175	3.9

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10. 1 represents the lowest risk while 10 represents the highest risk for each category.

From the viewpoint of respondents in Europe, the highest risk factor is marine pollution with 4.8 while the risk of fire is the lowest with 3.5. As mentioned in the priority factor in chapter 5.3.1, the respondents seem to worry about the ship environmental factor. Otherwise, the respondents of S. Korea said that the highest risk factor is collision or allision with 4.3 while the lowest with 3.9 is machinery/electronics failure in port.

### 5.3.3. Perception about safety measures for cruise ships in port

With regard to the safety measures shown in Table 2, 74.2 percent of overall respondents stated that such measures sufficiently enhance port safety given the rapid increase in the cruise ship industry. Over 78 percent of respondents from S. Korea chose 'Yes' as shown in Table 13. In particular, only 3.2% of participants from both regions said 'No', representing not sufficient measures for port safety. Considering that the different port traffic environments need different safety measures, the rate of positive response including 'Yes' and 'Not sure' reached 96.8%.

Table 13

*Perception about safety measures in port*

Division	Yes <sup>11</sup>		No		Not sure		Total	
	No	%	No	%	No	%	No	%
Total number	46	<b>74.2%</b>	2	3.2%	14	22.6%	62	100
Europe	10	62.5%	1	6.3%	5	31.3%	16	100
S. Korea	36	<b>78.3%</b>	1	2.2%	9	19.6%	46	100

Furthermore, 78.3 percent of respondents from S. Korea said that the measures enhance the port safety while 62.5 percent of Europe expressed their agreement. Those who responded “No” and “Not sure” in S. Korea, think the additional tactics shown in Table 14 would be the most beneficial for improving safety in Busan and Incheon ports. The survey showed the additional VTS service with 7.9<sup>12</sup> would be the most beneficial service to improve port safety, while the designation of safe speed with 5.7 would be the least beneficial.

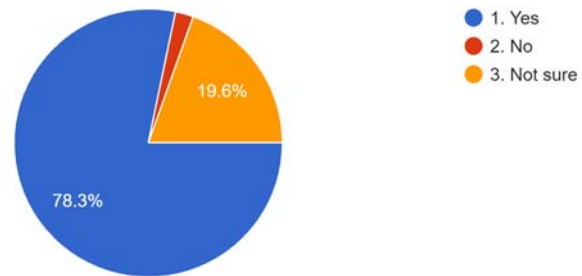


Figure 8 The opinion about sufficiency of safety measures

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11. 'Yes' means safety measures sufficiently enhance port safety.

12. The rate of each service from 1-10 means that 1 represents least beneficial while 10 represents most beneficial.



Besides this service, some participants of the survey suggested that training is necessary because of the different types of operation of cruise ships and other vessels and the safety culture is also important not only for their own ships but even for other ships especially considering the spread of maritime leisure activities in S. Korea.

Table 14

*Additional tactics to be most beneficial for improving safety in port*

Division		Mandatory Pilot Service			Mandatory Tugboat service			VTS Service			One-way passage designation			Safe speed designation		
		No	Sum	Ave	No	Sum	Ave	No	Sum	Ave	No	Sum	Ave	No	Sum	Ave
South Korea	Total	8	62	<b>7.8</b>	8	58	<b>7.3</b>	8	63	<b>7.9</b>	8	58	<b>7.3</b>	9	51	<b>5.7</b>
	No	1	10	10	1	10	10	1	9	9	1	9	9	1	10	10
	Not sure	7	52	7.4	7	48	6.9	7	54	7.7	7	49	7.0	8	41	5.1

In addition to the above safety services, participants from Europe who work in MA and PA made several proposals for desirable measures to optimize the cruise ships' safety in port. They highlighted the joint training among escort tugs, local Search and Rescue (SAR), fire brigades and health care professionals in cooperation for accidents “from the sea” and also drills between shipping lines and port authorities to ease the later operational processes. Furthermore, a professional participant at sea proposed the importance of strong bollards with good lead expressing that “big cruise ships are at risk when engines are stopped and winds increase rapidly”, which matches the suggestion of wind restrictions proposed by the other participants.

## 5.4. Immigration issue

### 5.4.1. Data analysis from S. Korea and Europe

Table 15

*Desirable time for immigration (Unit: minutes)*

Division	Under 30		30 to 60		60 to 90		90 to 120		Other		Total	
	No	%	No	%	No	%	No	%	No	&	No	%
Number of respondents	37	<b>47.4</b>	28	<b>35.9</b>	3	3.8	6	7.7	4	5.1	78	100
From Europe	25	<b>75.8</b>	5	15.2	1	3.0	1	3.0	1	3.0	33	100
From S. Korea	12	26.7	23	<b>51.1</b>	2	4.4	5	11.1	3	6.7	45	100

Regarding the scenario of a cruise ship carrying 5,000 passengers and planning to stay in port for 8 to 12 hours, 47.4 percent of respondents think that the desirable time for immigration of passengers is under 30 minutes, while 35.9 percent said 30 to 60 minutes, which together represents 83.3 percent as shown in Table 15. In other words, they think that from under 30 minutes up to 1 hour is an appropriate amount of time for immigration agencies process cruise ship passengers during port calls. In addition, the expectancy of the time from Europe is higher than that of S. Korea showing the highest ranges from 30 to 60 minutes for immigration time. 77.8 percent of the participants from S. Korea wanted to pass immigration in less than 60 minutes.

Table 16

*Real time for immigration or movement*

Division		Under 30		30 to 60		60 to 90		90 to 120		Other		Total	
		No	%	No	%	No	%	No	%	No	%	No	%
<b>Movement time</b>	Within EU Countries <sup>13</sup>	28	100	-	-	-	-	-	-	-	-	28	100
<b>Immigration time</b>	Non-EU Country <sup>14</sup>	15	53.6	9	32.1	3	10.7	1	3.6	-	-	28	100
	S. Korea	Expected overall time <i>from about 120 to 150 minutes</i> <sup>15</sup>											

However, in a Non-EU country and S. Korea, there is a gap between the desirable and real immigration time. Similarly, the author's participation also showed the same result as the survey shown in Table 15 and 16. From the author's participation, all destinations except for the first day of St. Petersburg satisfied the above desirable time. Even within EU countries the real time was all under 30 minutes. In detail, the survey

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13 Based on the survey from 28 passengers of Cruise ship, Norwegian getaway called at Copenhagen(Denmark), Stockholm & Visby(Sweden), Helsinki(Finland), Tallinn(Estonia)

14 Based on the survey from 28 passengers of Norwegian getaway called at St. Petersburg, Russia, which the author was on board. This is only based on 1st day. 2nd day could be considered as almost same with other destinations of the cruise ship.

15 Based on the response from the immigration authority in case that 5,000 passengers pass the passport control in Incheon cruise terminal and 10 immigration officers work at the case (MOJ, 2019.5, 2019.9).

received 28 responses from Norwegian Getaway passengers. As shown in Table 16, the survey showed that all passengers did not need immigration processing in their destinations except for St. Petersburg due to the Schengen agreement. However, in Russia as a non-EU country, the passengers had to suffer from the immigration process. For this reason, the real immigration time was more than the desirable one of the passengers. As shown in the survey, 75.8 percent of respondents from Europe chose under 30 minutes as a desirable time for immigration, while the real time under 30 minutes occupied 53.6 percent. Therefore, there was a gap of 22.2 percent between desirable and real time. However, within EU countries, the time was enough to satisfy the expectancy of the passengers.

In S. Korea, according to the immigration authority, it is necessary to operate the immigration procedure for about 2 hours to audit the passengers to go out, which does not mean that every passenger took 2 hours to pass passport control. The 2 hours does not mean the individual immigration time for passengers but includes the whole time of the operation of passport control, which means that someone can go outside in less than 30 minutes but others need 2 hours to pass the terminal. In some aspects, this does not satisfy the desirable time for passengers.

In this regard, the author surveyed how to improve immigration processing in response to the growth of the cruise industry in East Asia. The result of the survey showed that the tactics shown in Table 17 would contribute most to improving immigration processing time for cruise passengers.

Table 17

*Tactics to most contribute the immigration process*

Division	Standardized procedure <sup>16</sup>		Integrated system <sup>17</sup>		Additional gates <sup>18</sup>		on board immigration <sup>19</sup>		other		Total	
	No	%	No	%	No	%	No	%	No	%	NO	%
Total No. of respondents	19	24.4	29	<b>37.2</b>	19	24.4	7	9.0	4	5.1	78	100
From Europe	10	<b>30.3</b>	9	27.3	6	18.2	4	12.1	4	12.1	33	100
From S. Korea	9	20.0	20	<b>44.4</b>	13	28.9	3	6.7	0	0.0	45	100

An integrated system like Maritime Single Window was chosen as the first tactic to improve immigration time from all participants in the survey. The second and third were ranked as standardized procedure and additional gates. However, the respondents of S. Korea considered the integrated system as the first measure to improve the time while the standardized procedure was considered to be the priority in Europe.

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<sup>16</sup> A standardized immigration reporting and procedure among ports of adjacent countries the cruise ships generally calls

<sup>17</sup> An integrated system of immigration information sharing with ports of adjacent countries the cruise ship generally calls

<sup>18</sup> Additional immigration screening gates and immigration officers within port facilities

<sup>19</sup> Having immigration officers board cruise ships off-shore and conduct all passenger screening during inbound transit into port

The main reasoning of respondents from S. Korea in choosing each tactic was as follows. They said the priority among tactics is to develop the integrated system with adjacent countries due to the cost-benefit, speed-up of immigration and enhancement of security, convenience and contribution to the development into the integrated cruise market.

Table 18

*Proposals made by respondents*

Standardized procedure	<ul style="list-style-type: none"> <li>● Integrated system, additional screening gate and officer board are required to take financial burdens.</li> </ul>
Integrated system	<ul style="list-style-type: none"> <li>● It seems to be faster and not requiring additional cost among the examples.</li> <li>● Sharing the immigration info of cruise ship in specific region through the system will not only speed up the immigration procedure but also help enhancing the ship's security.</li> <li>● Necessary to develop 3 neighbouring countries into integrated cruise market</li> </ul>
Additional gates	<ul style="list-style-type: none"> <li>● It is necessary to expand sufficient manpower and facilities for quick immigration screening.</li> <li>● More gates would ensure the accuracy and speed for processing.</li> <li>● There is not enough screen gates in Korean main ports now.</li> </ul>
on board immigration	<ul style="list-style-type: none"> <li>● In order to save time, efforts in the immigration department are needed rather than improvement of equipment.</li> </ul>

## 5.5. The observation of the author during on board cruise ship

### 5.5.1. Immigration process

On 31<sup>st</sup> July I arrived at the terminal gate at about 15:30 for check-in to be on board the cruise ship. The check-in was completed before 15:55, which it took about 25 minutes. The following is my timeline; I entered the terminal gate and had a security inspection for my baggage and me and then waited in line for check-in. The immigration officer checked my cruise documents and passport and then took a picture of my face to put in the system. The officer gave me a card called a “Freestyle card”, which was used to pass the gate located between the terminal to the cruise ship at berth. When I arrived on the ship, I was checked by a ship security officer who compared my Freestyle card with the registered information of the system. It was my observation that the exclusive facility for cruise ships was well equipped for check-in process as a homeport terminal. On the same day, passengers received information from the Russian Immigration Advisory through NCL that “all guests going ashore have to pass through mandatory immigration inspection” and “those guests wishing to go ashore on Day 1 and Day 2 can book Debark group’ to ensure smooth, timely and orderly debark.

On 1st August, one day prior to arrival in St. Petersburg, I spoke to the staff at Guest Services to apply for the Debark group to go ashore. The staff said that passengers participating in Organized Shore Excursion will start the immigration process first and then the other guests will be processed according to the Debark Group, which was also referred to in the daily information magazine called Freestyle Daily. According to staff, immigration would take from 1 hour to 2 hours depending on the lines and other factors.

In particular, passengers without Russian visas could go ashore but “only if they are participating in organized Shore excursions” with a valid passport, a completed immigration card and a respective tour ticket (Freestyle Daily, 2019.8.2). I was assigned to the Debark Group 4 on both the 1<sup>st</sup> and 2<sup>nd</sup> day in St. Petersburg when I applied for a group at the Guest service center. The ship arrived at about 6:00 pm as scheduled and then the order of passenger immigration was announced one by one. I gathered at the assembly station located on deck 6 at around 7:35 pm and moved to the immigration gate to pass passport control, which had 36 immigration booths to handle it. I personally cleared immigration at about 8:05 pm including the pure immigration check time, 1 minute 16 seconds shown in Table 19. In other words, the author’s case took 2 hours 5 minutes from the arrival time of the ship to the end of immigration. The average time of the personal check from the immigration officer in a passport control gate reached 1 minute 9 seconds per person as shown in Table 19.

Table 19

*Pure immigration check time in a passport control gate*

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E (Author)</b>	<b>Average</b>
1:27	48	1:06	1:07	1:16	<b>1:09</b>

*Note.* Checked in St. Petersburg and made by author (unit: minute, second)

On the following day in St. Petersburg on August 3, the calling of Debark group started about at 8:00 am. My group departed at 08:31 from the assembly station on deck 7 and I could clear immigration by 08:36, which took just 5 minutes for the whole immigration process. Specifically, the real check time of the immigration officer took also only 10 seconds for me because I think it was the second times.



In the next port of call, Helsinki in Finland, the ship arrived at about 07:50 am and the announcement was made to allow the passengers to go outside. There was one gate to go in and out of the terminal and 3 or 4 persons who looked like security guards. Unlike St. Petersburg, passengers were allowed to go out without an immigration process at the gate. Therefore, I went outside of my cabin at 10:00 am when I wanted and was able to pass the terminal gate at about 10:08. The movement time took only 8 minutes for me because there were two simple processes, which the first was to pass through the ship gangway after my electronic boarding card check and then the second was just to walk through the terminal gate. When I came back, I just needed to show my electronic Getaway Guest key card to security officers working at the terminal gate and I also had to show the card at the gangway gate of the ship to the crew in charge of security to be on board the ship. The returning time to my cabin from terminal gate was under 10 minutes.

On 5 August, the ship docked at Terminal A, Old City Harbour at about 07:52 am and it was announced that the ship had cleared at 07:57. When proceeding to the gate, the original passport and Guest key card must be carried when going ashore. There was also a notice stating that passengers had to be on board by 16:30, 30 minutes prior to departure of the ship. I left at about 09:55 am and could pass the gate of the terminal at 10:07 without the immigration process after the check-out process of the ship like in Helsinki. At the gate, there were security guards. The main attractions were just 20 minutes away from the terminal by foot and I could sight-see until I was satisfied. The embarking process was the same as in the Helsinki port, only taking about 10 minutes depending on the traffic of passengers. There was a check-in process in the gangway to identify and compare the card with the holder followed by checks of guest key cards by the terminal security guard.

In Stockholm Frihamnen 638, Sweden, the ship docked at 08:15 am and was cleared at 08:41 according to the announcement. I started the trip to the city of Stockholm at 09:00 and could go out of the terminal at 09:05 after only 5 minutes because there was also no immigration process for the same reason. However, there was the same

procedure as in the previous port of call, i.e., the ship identified the card to record the passengers going out into the gangway and then passengers could go through the gate of the terminal where 3 security guards worked. When coming back to the ship, there was also the same procedure as before.

On the next day, August 7, the ship docked at Visby cruise terminal at 08:00 am and I departed from my cabin to go out at 10:45 when I want and passed the gate of the terminal, taking only 6 minutes. There was also no immigration process in Visby terminal. At the gate, there were terminal security guards to control the movement of passengers from and to the gate, which makes the process flow very smoothly. In addition, I think the main attractions are located near the terminal so the passengers could walk about 20 minutes to get there and enjoy their tour in limited time. The procedure of the on-board process was the same as previously. As the final destination, the vessel arrived at its homeport, Copenhagen, as scheduled on 9th of August. The procedure to check out in the terminal was also considered to be very smooth and systematic, with no immigration process so passengers could go out only with the touch of their electronic boarding card which recorded the check-out time. All things considered, the experience of the author to the cruise ship was very satisfactory for the smooth movement in the ship's destinations and amenities on board ship and so on.

#### **5.5.2. Safety measures by visual check of the author**

When entering and departing the cruise terminal, the ship operated according to schedule. The author observed that the ship did not have any support of tugboats and the author also made the observation that the ship used pilot on board service only in Stockholm and Visby in Sweden. Helsinki and Tallinn cruise ports did not use the pilot and tugboat service for their cruise ships.

Table 20

*The safety measures observed by author*

Port name	Pilot <sup>20</sup>	Use of Tugboat	Traffic volume <sup>21</sup>
① Copenhagen, Denmark (Outbound)	Not on board	No	Low
② St. Petersburg, Russia (In & out bound)	Not on board	No	Low
③ Helsinki, Finland (In & out bound)	Not on board	No	Low
④ Tallinn, Estonia (In & out bound)	Not on board	No	Low
⑤ Stockholm, Sweden (In & out bound)	On board	No	Medium
⑥ Visby, Sweden (In & out bound)	On board	No	Very Low
⑦ Copenhagen, Denmark (Inbound)	Not on board	No	Low

*Note.* From author's observation based on a visual check and edited by author

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<sup>20</sup> the data is based on the visual observation from the author, which the other ports except for Stockholm and Visby might use the pilot service.

<sup>21</sup> traffic volume is based on the views of the author. For example, low volume means that the author rarely watched the other types of ships navigating nearby. Visby is the island and Stockholm cruise terminal has a long and narrow channel from sea to the terminal.

## **6. PROPOSALS**

There could be several proposals reflecting the survey and observations of the author for cruise ship participation. The proposals of high priority to be considered, could be summarized into three categories such as safety, immigration and other issues such as environment and infrastructure to meet the growing needs of the cruise industry.

### **6.1. Safety measures**

Remarkably speaking, 74.2 percent of respondents in S. Korea and Europe think the safety measures implemented in Busan and Incheon ports in S. Korea are mostly regarded sufficient to enhance the safety of cruise ships using the ports as shown in Table 13.

In addition, regarding the overall safety risk, respondents thought that the risk ranks 4.4 points, which is less than medium risk level on a scale from 1 to 10. However, in Europe, the marine pollution factor with 4.8 points is higher than overall risk while respondents from S. Korea considered the collision of cruise ships as the highest risk with 4.3 as shown in Table 12. In this regard, the risk of marine pollution and collision

should be reviewed and appropriate measures should be developed to mitigate such risks in port. Furthermore, additional safety measures were proposed by participants from Europe to optimize cruise ship safety in the ports of Busan and Incheon. Considering their expertise, their main opinions as shown in Table 21 should be reviewed and adopted if it is available in both ports for further risk control measures.

The cruise ship industry is very attractive with regard to job creation and economic growth. Nevertheless, this attractive industry has the potential to cause a large scale ecological and economic disaster should an accident occur. However, if port authorities were to prepare for the cruise ship trend in tune with safety and facilitation of the cruise ship port services, this industry would bring more attractiveness to the local economy because more cruise ships would select the port of Busan and Incheon with better services as port of call. Considering the role of the port authority, there are several measures that could be taken to prevent accidents and facilitate the safe transit of cruise ships inbound and outbound of the port. A case in point is that accidents cause loss of life, pollution and economic loss. In particular, it may cause massive casualties of passengers because the recently built cruise ship can accommodate as many as 5,000 passengers. As a result, the role of the port authority is critical in taking preventive measures against risks in port.

Table 21

*Proposals to consider to mitigate the safety risk in port*

Division	Additional safety services to consider
From Europe	<p>①Wind restrictions, Strong bollards with good lead.</p> <p>∴ Big cruise ships are at risk when engines are stopped and winds increase rapidly / considering the case of Viking</p> <p>②Escort by attached tug</p>

	<p>∴ e.g., would probably have avoided accident in Venice (2019.6).</p> <p>③A joint training among stakeholders such as shipping lines, Port Authority, escort tug, local SAR organization, fire brigade and health care in cooperation for accident “from the sea”.</p>
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## 6.2. Ship Environment and Infrastructure

In addition to the safety and immigration issue discussed in the dissertation, the authority in charge of the development of the cruise industry should prepare for environmental and waste management services like port reception facilities to meet the growing needs of the cruise industry. When it comes to the survey results, respondents from Europe with a longer history of the cruise industry than those in S. Korea chose to put the environmental issue as top priority to best meet the growing needs of the cruise industry as shown in Table 9.

In Europe, “In general, NOx emissions from the analysed cruise ships are about 15% of total NOx emitted by Europe’s passenger car fleet in a year” (Transport & Environment, 2019). In this regard, “the cruise tourism industry needs to balance both environmental impacts and benefits to transition towards a more sustainable tourism model” (Ruiz-Guerra, et al., 2019). Furthermore, a popular city has showed the movement to cap the number of cruise calls in port because of concerns of pollution in the city (“Barcelona: limit cruise calls”, 2019). The result of the survey in Europe would imply that cruise ports in S. Korea could face a similar situation in the near future. The fact that only 5.4 percent of respondents from S. Korea chose the cruise ship environment service as the lowest should be considered and it should pay attention that the aspect of cruise ship environment did not be included in the report of the development strategy of cruise industry at all (KMI & KCTI, 2015).

In this regard, the authority should review the current situation and measures for this matter and take appropriate action before the concerns are raised. Desirably, the person working in port facility division for Incheon Port Authority (IPA) said to me that “Incheon new cruise terminal opened on April, 2019 did not equip with Shore Side Electricity (SSE) for cruise ship but SSE will be installed” (IPA, 2019.9). SSE is an alternative option not to make cruise ship at berth use auxiliary engine generating emissions, which reduce air pollution and greenhouse gas emissions from cruise ships at berth near city center (Winkel, Weddige, Johnsen, Hoen & Papaefthimiou, 2016).

Furthermore, the survey showed that infrastructure such as an exclusive terminal and dedicated berthing areas for cruise ships should be prioritised to meet the increasing needs, which was ranked in a high priority in both regions as shown in Table 9. The result of 32.4 percent among respondents with the developed cruise industry of Europe shows that this aspect should be highly reviewed and prepared long in advance to further the cruise industry and meet the demands since the investment of infrastructure takes time and a substantial budget.

### 6.3. Immigration process

Through the results of the survey in both regions, it is clear that there is a big gap between the real time and the expected time for immigration. In this regard, in order to attract cruise ships further in S. Korea, the immigration process system should be developed in some aspects. The immigration authority has been trying to keep up with the development of the cruise industry. For example, the authority used the onboard immigration officer system to reduce the immigration time, which was considered to be very useful in the immigration process because officers could work on their tasks during the cruise ship's voyage until arrival at the port of call in S. Korea (KMI & KCTI, 2015).

However, the authority stopped using the on board immigration system after the exclusive terminal was introduced, which the change led to the problems such as an inconvenience of passengers because of longer immigration time (Federation of Korean Industries [FKI], 2016). As shown in the survey result of chapter 5, the immigration system should respond to the expectation of cruise passengers who experienced longer than the actual immigration time. Moreover, considering the short stay in port, the immigration time is a very important factor in choosing the port of call of cruise ships. In this regard, the authority should pursue the other aspect and open their eyes up to the solution outside because the authority has tried various ways to upgrade the immigration process, but there are still limitations on the immigration time despite inside efforts.

Consequently, the introduction of Maritime Single Window (MSW) among adjacent countries will be contributed to the improvement of immigration process of Northeast Asia cruise industry as well as S. Korea when considering five elements such as ①the big gap between desirable and real time of immigration mentioned in chapter 5.4.1, ②the integrated system chosen as the most contributor from the survey shown in Table 17, ③a cruise ship's short stay of 6 to 9 hours in S. Korea (KMI & KCTI, 2015), ④the fact that pure immigration time for a passenger in a passport control gate just takes under a minute mentioned in Table 3 & 19 and ⑤the contribution to common interest of cruise industry in Northeast Asia. In this respect, the following will discuss further the aim, main features, scope and expansion of Maritime Single Window.

#### 6.3.1. The aim, definition and main features of MSW

“The ‘Single Window’ (SW) environment aims to expedite and simplify information flows between trade and government and bring meaningful gains to all parties involved in cross-border trade.” (United Nations Economic Commission for



Europe [UNECE], 2003). In this aspect, the concept of SW was based on the facilitation for cargo handling in port. United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT, 2005) defines SW as “a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements. If the information is electronic, then individual data elements should only be submitted once”.

According to EMSA (2017), the main features of the MSW prototype for Europe are that all formalities including eManifest are submitted to authorities of Member States in a harmonized manner and the authorities report decisions to ship data providers and then the information may be shared as shown in Figure 9 (European Maritime Safety Agency [EMSA], 2017).

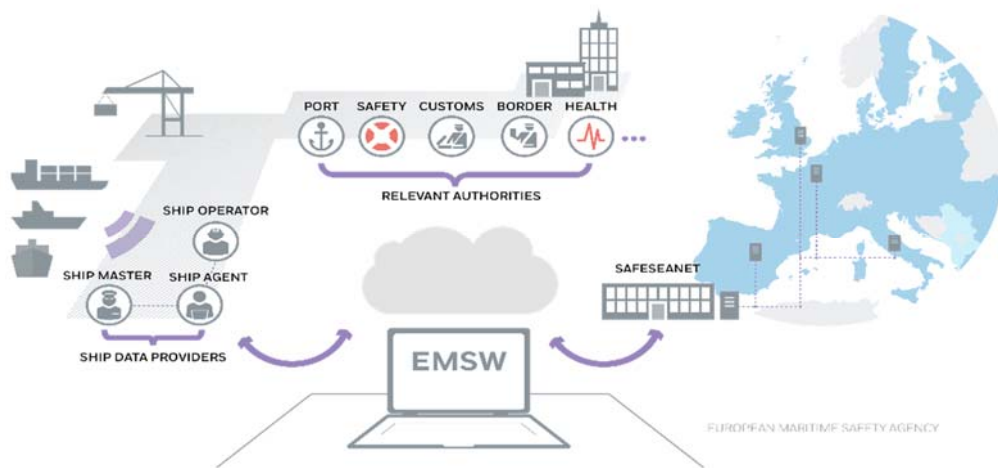


Figure 9

EMSW Prototype. From EMSA Homepage, 2019

“The effect of a SW is one-stop to exchange information between traders and government agencies. It greatly reduces the complexity, time and costs involved in international trade. Many countries, including developing countries and transition economies, regard SW as an important instrument to increase the competitiveness of their national economy” (UNECEa, 2011). Many governments have recognized SW as a crucial instrument that can be used to enhance the efficiency and effectiveness in business (UNECEa, 2011).

#### 6.3.2. Scope of MSW

“The United Nations (e.g. UNECE and UN/CEFACT), the World Customs Organization (WCO), the International Organization for Standards (ISO), and other international standardization organizations such as IMO are examples of stakeholders at level 4. Figure 10 provides an example of the inter-organizational stakeholder groups at the four levels.” (UNECEa, 2011)

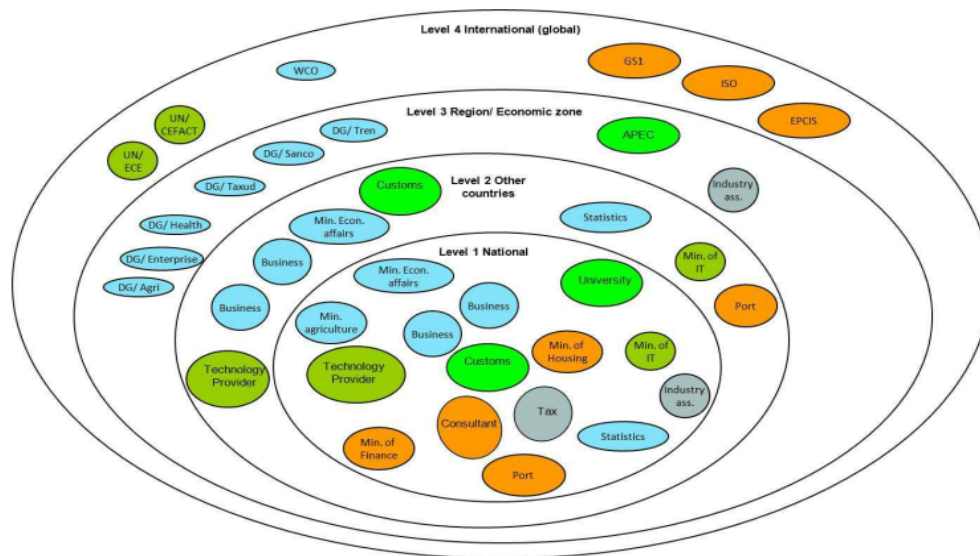


Figure 10

A multi-level network overview of inter-organizational SW stakeholders. From

Rukanova et al., 2009

Likewise, each nation or organization makes use of the SW concept for its purpose in various perspectives. For example, the World Customs Organization (WCO) focuses on goods handling in the supply chain of cargo and Single Window System (SWS) is a trade facilitation tool which “permits the trader or transporter to submit all the data needed for determining admissibility of the goods in a standardized format only once to the authorities involved in border controls and at a single portal” (WCO, 2019).

On the other hand, IMO Facilitation (FAL) concentrates on ships in port and the FAL Convention's main objectives are “to prevent unnecessary delays in maritime traffic, to aid cooperation between governments, and to secure the highest practicable degree of uniformity in formalities and other procedures”. “In particular, the Convention reduces the number of declarations which can be required by public

authorities” (IMOb, 2019). UN/CEFACT Recommendation 34 requires “a simple four-stage process to achieve a national simplified and standardized dataset to meet government information requirements”. “The main idea is to make all the relevant agencies and trade operators “speak one language” using the same classifiers and codes compliant with international standards” elaborated by United Nations Economic Commission for Europe (UNECE).

According to IMO FAL Convention, each Member State had to establish new systems for the Electronic Exchange of Information (EDI) by April 8, 2019. However, the Member State could use something other than ‘single window’ for this purpose. In the case of the EMSA prototype, for ships arriving in and ships departing from ports situated in EU member states, all information is reported once and made available to various competent authorities and the EU member states. S. Korea has adopted and made use of MSW from the early stages based on, for example, the act on arrival and departure of ships, Article 50 which started from 2004 for the ships arriving in Korea.

### 6.3.3. the expansion of the use of MSW

According to the definition of World Cruise Association and associated scholars, cruise tour is defined as a traveling ship with more than 2 calling ports. Cooperation among adjacent countries should also be considered for further development of the national cruise ship industry as the cruise ship operation patterns in Northeast Asia are closely connected with each other (Yang, 2016).

As discussed above, the MSW could play a role in contributing to the efficient and effective immigration process among adjacent countries such as EU member states. The introduction of MSW in Northeast Asia could facilitate the development of the cruise industry further by giving convenience to the cruise ships and passengers. For example, cruise ships choosing Incheon Port tend to make ports of call in China and

Japan before and after entry into Incheon because these ports are close geographically, which means there are common factors needed to respond to the growth of the Asian cruise industry. It must be reminded that the stay time of cruise ship in port is 6 to 9 hours usually without overnight (KMI & KCTI, 2015) and if considering the reduction time mentioned in Table 7 the stay time would be diminished more and in this case, in my opinion, it does not seem to be that attractive destination of cruise ships.

In addition, the adjacent countries have already used MSW for their own purposes, especially to facilitate the trade in port. Furthermore, there has already been a similar case to exchange information in the government-related port logistics of China, Japan and the Republic of Korea through the Northeast Asia Logistics Information Service Network (NEAL-NET) achieved by utilizing the legacy systems of LOGINK of China, Colins of Japan and SP-IDC of S. Korea “aiming at realizing seamless logistics in Northeast Asia” (IMO FAL/INF.6, 2016). Moreover, “NEAL-NET has already developed 94 enterprise users and the numbers of daily queries are more than 160 thousand times” (LOGINK, 2019). Therefore, the connection by MSW among adjacent countries only depends on their willingness, similar to the Schengen agreement because the technical requirements are considered to be ready when contemplating the activation case of NEAL-NET.

In addition to the above, if connected through MSW, it is expected that the MSW could contribute to the enhancement of safety services such as Search and Rescue (SAR) because the system can share the details of passenger information in the event of an emergency. Moreover, the important factor of SAR is the time to respond to the situation in good time (Yeong, King & Dol, 2015). The sharing of information through MSW with SAR authorities could also help the formation of an effective response system.

In this respect, the author proposes to adopt the agenda about the new system in a future ministerial level conference having held every two years like in the case of NEAL-NET facilitating the share of logistical information, which was agreed to

conduct the research in the third China-Japan-Republic of Korea Ministerial Conference on Transport and Logistics held in May 2010 (IMO FAL/INF.6, 2016).

## **7. CONCLUSION, LIMITATION AND FURTHER STUDIES**

### **7.1. Conclusion**

The cruise industry of S. Korea has grown rapidly from 0.03 million passengers in 2005 to 1.95 million in 2016, which has contributed to the local economy. However, the growth of the industry requires the development of port operation services to prevent or mitigate safety risks in the ports and manage the concentration of passengers facing immigration traffic. Therefore, without the proper responses to these new challenges, the industry will not be able to ensure sustainable development and subsequently may lose its attractiveness.

In this regard, the result of the survey, including the observation of the author, identified three meaningful results through the analysis of the survey data from S. Korea and Europe respectively. First, unlike the expectation of the author, the survey showed that the average effect on the risk of overall safety resulting from the growing number and size of cruise ship to the port was ranked 4.4, meaning lower than a medium risk marking of 5, while 10 represents the highest risk. Therefore, the figure

could be accepted as ALARP<sup>22</sup> for the port safety influence. Moreover, the survey shown in Table 13 shows that about 74.2 percent of total participants responded that safety measures taken on cruise ships in Busan and Incheon ports are sufficiently enhancing port safety, giving a rapid increase in cruise ship traffic. In addition, participants from S. Korea proposed that VTS services would be the most beneficial for improving the safety, whilst participants from Europe proposed additional safety services such as wind restrictions, escort by attached tugs and a joint training among stakeholders for accidents “from the sea” in chapter 5.3.3.

Second, the survey indicated that there was a big gap between the desirable and real time of immigration for passengers, which means the inconvenience of passengers would grow bigger if their concentration increases. The result of the survey of passengers on board Norwegian Getaway showed that their desirable time was matched 100 % with the real time within destinations of EU countries as illustrated in Table 15 and 16. However, in St. Petersburg as a non-EU country without Schengen agreement, 53.6 % of respondents were in line with the most desirable time under 30 minutes as shown in Table 16. This might cause the cruise company to stay for two days to satisfy the passengers’ tour. Based on the author’s observation, thanks to Maritime Single Window (MSW) and the Schengen agreement, no immigration process in the other destinations could easily provide their leisure time relatively in spite of their actual stay for around 7 to 8 hours as shown in Table 7. Likewise, there was also a clear difference in S. Korea shown in Tables 15 and 16. Therefore, the authority in charge should find the unique ways from outside, not inside, to satisfy the passengers such as connection of MSW as discussed in chapter 6.3 to reach up to the level of port of calls located within the Schengen agreement and also take note of the

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22. Refers to a level of risk that is neither negligibly low nor intolerable high (IMO MSC-MEPC.2).

pure immigration time within about 1 minute shown in Tables 3 & 19. Unlike the airplane case, the immigration time issue could never be ignored when considering a cruise ship's short stay of 6 to 9 hours in S. Korea (KMI & KCTI, 2015) and its fixed schedule for next destinations with the same passengers on board cruise ship. The success of previous cases like NEAL-NET shown in chapter 6.3.3 indicates the possibility of realistic implementation.

Third, the most remarkable difference between Europe and S. Korea was the ship environmental service that professional participants from Europe chose as the highest priority to meet the growing needs of the cruise industry and in reality, there has been a limitation measure of cruise calls because of concerns of air pollution in Europe as mentioned in chapter 6.2 and so on. However, this issue ranked lowest among port operation services as shown in Table 9. The big gap between both regions shows that it is necessary to prepare for attentive approach for the ship environmental service like the installation of shore side electricity to reduce unwanted air emission from cruise ships moored in the proximity of the central city as discussed in chapter 6.2. Moreover, the infrastructure including exclusive terminals was chosen as a priority from respondents in both regions, which should be dealt with as a priority to increase the industry in S. Korea.

Without further delay, the port operation services are essential to attract the cruise industry further and particularly the safety and immigration service should be further developed as discussed above. Moreover, the ship environment service and infrastructure should also be considered as a high priority to meet the demands of the industry. In other words, the ship environmental issue should be researched and prepared in a prompt manner to ensure the sustainable development of the industry. The attractiveness of port of calls of cruise ships depends on the port operation service affecting the choice of destinations, which would subsequently play an essential role in contributing to the continuous growth of the cruise industry.



## 7.2. Limitations and further studies

First, the dissertation mainly discusses the safety and immigration issues when meeting the increasing demands of the cruise industry. However, there are many port attractiveness criteria to consider as shown in Figure 4. According to the results of the survey shown in Table 9, the infrastructure was chosen as a high priority in both regions. Moreover, the ship environmental and waste management services was picked as the top priority in Europe, while it was the lowest in S. Korea. In this respect, both factors should be researched further and additional research could prompt the development of port operation services.

Second, in terms of safety services in port of call, different ports require diverse types of safety measures considering the ship traffic volume, breadth and depth of the waterway and location of the terminal, affecting the safety of the ships. In this respect, the opinions of participants of the survey from Europe may limit the actual evaluation due to lack of experience of Busan and Incheon ports. In addition, the evaluation of safety measures should rely on the port users, especially professional seafarers. However, the respondents of the survey were mainly from maritime administration and port authority, port operation service providers such as pilots.

Third, in regard to the immigration issue, the desirable duration of immigration was determined by surveying both regions; however, the real time was identified only in Europe, while the time in S. Korea was received from the authority in charge. Furthermore, the starting point of the immigration process time could be different depending on respondents since some may count the time from their cabin whilst others may count the time from elsewhere, for example the gangway of the vessel.

Lastly, in reality, Maritime Single Window (MSW) connected with adjacent countries could be the best way to facilitate the immigration process. However, the immigration issue is on the sovereignty of each country and the willingness of

interested parties would be the determining factor in connecting MSW even though each country has already used single window for its purposes like facilitation of ship cargo handling and there has been a successful example of NEAL-NET as discussed in Chapter 6.3.3.

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\* Further details are available upon request.

## **APPENDIX A**

### **Part 1: Questionnaire on Port Operation Services for Cruise Ships calling port in South Korea**

#### **1. General questions**

1.1. Which of the following aspects of port services do you think should be prioritized in order to best meet the growing needs of the cruise ship industry? Please choose no more than two.

- 1 Ship safety services such as Vessel Traffic Services (VTS), Pilotage and safe speed
- 2 Immigration services to more efficiently facilitate the movement of passengers
- 3 Ship and passenger security measures (ISPS Code)
- 4 Ship environmental and waste management services (port reception facilities)
- 5 Infrastructure including exclusive terminals and dedicated berthing areas for cruise ships
- 6 Other – please write \_\_\_\_\_

1.2. Please briefly explain your reasoning for your response to question 1.1 Why do you feel these need to be the biggest areas of focus?

#### **2. Safety of Cruise Ships**

2.1. How much do you think the increasing size and number of cruise ships increases safety risk in your port? Please rate the effect on each factor from 1-10 by marking with an “X”. 1 represents the lowest risk while 10 represents the highest risk for each category.

	1	2	3	4	5	6	7	8	9	10
	(Low risk)			(Medium)					(High risk)	
Overall safety										
Fire										
Machinery/Electronics Failures (engine failure, etc.)										
Stranding or grounding										
Collision or allusion										
Marine Pollution										

(\* major causes of cruise ship incidents, Source: CLIA Report on operational incidents, 2009 to 2017)

2.2. Table 1 (shown below) reflects increased safety measures which have already been implemented for cruise ships in the Ports of Busan and Incheon Korea. Do you think such measures sufficiently enhance port safety given the rapid increase in cruise ship traffic?

1. Yes
2. No
3. Not sure

<Table 1.>

	Busan port	Incheon port
Traffic regulations	-(Pilot) mandatory, P/S different position available in heavy weather	-(Pilot) mandatory -(Tug) available for increased use



	-(Waterway) one-way passage according to cruise ship size -(VTS) special monitoring, etc.	-(Anchorage) available in emergency waiting anchorage in special conditions -(Safe speed) under 8kts (2019. 3)
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\* for your reference, no cruise ship accidents have been reported in S. Korea to date.

2.3. If you answered “No” or “Not Sure” to question 2-2, what additional tactics do you think would be most beneficial for improving safety in your port? Please rate each service from 1-10 by marking with an “X”. 1 represents least beneficial while 10 represents most beneficial.

	1	2	3	4	5	6	7	8	9	10
	(very low)			(medium)					(very high)	
Mandatory Pilot service										
Mandatory Tugboat service										
VTS service										
One-way passage designation										
Safe speed designation										
If others, write here ( )										
If others, write here ( )										

\* Please, briefly write your reasoning if available:

### **3. Immigration processing time of passengers**

3.1. According to a report from the Korea Maritime Institute (KMI), Immigration time for passengers should be improved in order to better attract cruise ships and passengers. In your professional opinion, what is the desirable amount of time for immigration agencies to take in processing cruise ship passengers during port calls.

Keep in mind that the goal is to attract cruise ships and passengers to choose your port as a destination, while still maintaining adequate measures for safety and security. When considering this, please use the scenario of a cruise ship which carries 5,000 passengers and which plans to stay in port for 8 to 12 hours.

- 1 Under 30 minutes
- 2 Between 30 minutes and 1 hour
- 3 Between 1 hour and 1.5 hours
- 4 Between 1.5 hours and 2 hours
- 5 More than 2 hours
- 6 if other, please specify: \_\_\_\_\_

3.2. Considering the increasing number and size of cruise ships operating in Far-East Asia, which of the following tactics would most contribute to improving immigration processing times for cruise passengers?

1. A standardized immigration reporting and procedure among ports of adjacent countries (China, Japan, etc.) the cruise ship generally calls
2. An integrated system of immigration information sharing with ports of adjacent countries the cruise ship generally calls (ex. Maritime Single Window)
3. Additional immigration screening gates within Port Facilities
4. Having immigration officers board cruise ships off-shore and conduct all passenger screening during inbound transit into port.
5. If other, please explain \_\_\_\_\_

3.3 Please briefly explain your reasoning for your answer to question 3.2

## **APPENDIX B**

### **Part 2: Questionnaire on Port Operation Services for Cruise Ships calling port in Europe**

#### **Questions**

##### **1. General questions**

1.1. Which of the following aspects of port services do you think should be prioritized in order to best meet the growing needs of the cruise ship industry? Please choose no more than two.

- 1 Ship safety services such as Vessel Traffic Services (VTS), Pilotage and safe speed
- 2 Immigration services to more efficiently facilitate the movement of passengers
- 3 Ship and passenger security measures (ISPS Code)
- 4 Ship environmental and waste management services (port reception facilities)
- 5 Infrastructure including exclusive terminals and dedicated berthing areas for cruise ships
- 6 Other – please write \_\_\_\_\_

1.2. Please briefly explain your reasoning for your response to question 1.1 Why do you feel these need to be the biggest areas of focus?

##### **2. Safety of cruise ships**

2.1. How much do you think the increasing size and number of cruise ships increases safety risk in your port? Please rate the effect on each factor from 1-10 by marking with an “X”. 1 represents the lowest risk while 10 represents the highest risk for each category.

	1	2	3	4	5	6	7	8	9	10
	(Low risk)			(Medium)					(High risk)	
Overall safety										
Fire										
Machinery/Electronics Failures (engine failure, etc.)										
Stranding or grounding										
Collision or allision										
Marine Pollution										

(\* major causes of cruise ship incidents, Source: CLIA Report on operational incidents, 2009 to 2017)

2.2. Table 1 (shown below) reflects increased safety measures which have already been implemented for cruise ships in the Ports of Busan and Incheon Korea. Do you think such measures sufficiently enhance port safety given the rapid increase in cruise ship traffic?

- 1 Yes
- 2 No
- 3 Not sure

	Busan port	Incheon port
Traffic regulations	-(Pilot) mandatory, P/S different position available in heavy weather -(Waterway) one-way passage according to size	-(Pilot) mandatory -(Tug) additional article for increased use

	-(VTS) special monitoring, etc.	-(Anchorage) available in emergency waiting anchorage in special conditions -(Safe speed) under 8kts ('19. 3)
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\* for your reference, no cruise ship accidents have been reported to date in S. Korea.

2.3. What additional safety services (if any) do you think are desirable to optimize cruise ship safety in the ports of Busan and Incheon South Korea?

### **3. Immigration processing time of passengers**

3.1. What is the average time needed for immigration processing for a ship with 5,000 passengers in your terminal?

- 1 Under 30 minutes
- 2 Between 30 minutes and 1 hour
- 3 Between 1 hour and 1.5 hours
- 4 Between 1.5 hours and 2 hours
- 5 More than 2 hours
- 6 if other, please specify: \_\_\_\_\_

3.2. How much time do you think is desirable for immigration processing in order to attract more cruise ships and passengers to your port? When considering this, please use the scenario of a cruise ship which carries 5,000 passengers and which plans to stay in port for 8 to 12 hours.

- 1 Under 30 minutes
- 2 Between 30 minutes and 1 hour
- 3 Between 1 hour and 1.5 hours
- 4 Between 1.5 hours and 2 hours
- 5 More than 2 hours
- 6 if other, please specify: \_\_\_\_\_

3.3. In order to facilitate immigration processing, what kind of measures does your port currently use? (e.g, infrastructure including additional gates for immigration, Maritime Single Window)

3.4. Considering the pattern of increased cruise ship operations in EU regions, which of the following tactics would most contribute to improving immigration processing times for cruise passengers?

1. A standardized immigration reporting and procedure among ports of adjacent countries the cruise ship generally calls
2. An integrated system of immigration information sharing with ports of adjacent countries the cruise ship generally calls (ex. Maritime Single Window)
3. Additional immigration screening gates and immigration officers within Port Facilities
4. Having immigration officers board cruise ships off-shore and conduct all passenger screening during inbound transit into port
5. If other, please explain \_\_\_\_\_

3.5. Please briefly explain the reasoning for your answer to question 3.4.

3.6. According to EU directive 2010/65/EU, member states have introduced Maritime Single Window (MSW) to facilitate cargo handling, etc. Does your port use MSW in this regard?

●MSW: For ships arriving in and ships departing from ports situated in EU Member States, all information is reported once by ship data provider and made available to various competent authorities and to other Member States in certain parts via SafeSeaNet.

1. Yes
2. No
3. Not sure

3.7. If yes, does your port use the MSW to facilitate cruise ship arrivals and immigration processing?

1. Yes
2. No
3. Not sure

3.8. Do you think that MSW has contributed to improving immigration processing time?

1. Yes (if yes, please estimate the reduction in time in minutes):  
\* e.g., 120 minutes in 2011 reduced to 90 minutes based on cruise ship with 5,000 passengers
2. No
3. Not sure



## APPENDIX C

### Part 3: Questionnaire only for passengers on board NCL Getaway in Europe

Immigration processing time of passengers

1. How long does it take for your immigration in each cruise terminal?

	Under 30 minutes	Between 30 minutes and 1 hour	Between 1 hour and 1.5 hours	Between 1.5 hours and 2 hours	More than 2 hours
St. Petersburg, Russia					
Helsinki, Finland					
Tallinn, Estonia					
Stockholm, Sweden					
Visby, Sweden					

2. How much time do you think is desirable for immigration processing in order to attract more cruise ships and passengers to your port? When considering this, please use the scenario of a cruise ship which carries 5,000 passengers and which plans to stay in port for 8 to 12 hours.

- ☐ Under 30 minutes
- ☐ Between 30 minutes and 1 hour
- ☐ Between 1 hour and 1.5 hours
- ☐ Between 1.5 hours and 2 hours
- ☐ More than 2 hours
- ☐ Others: \_\_\_\_\_

3. Considering the pattern of increased cruise ship operations in EU regions, which of the following tactics would most contribute to improving immigration processing times for cruise passengers?

- ☐ A standardized immigration reporting and procedure among ports of adjacent countries the cruise ship generally calls
- ☐ An integrated system of immigration information sharing with ports of adjacent countries the cruise ship generally calls (ex. Maritime Single Window)
- ☐ Additional immigration screening gates and immigration officers within Port Facilities
- ☐ Having immigration officers board cruise ships off-shore and conduct all passenger screening during inbound transit into port
- ☐ If other, please explain\_\_\_\_\_.

/// The End ///